Greif Inc - Climate Change 2023

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Tracing its roots to 1877 in Cleveland, Ohio, Greif, Inc. is a world leader in industrial packaging products. Our offerings include steel, plastic and fibre drums, intermediate bulk containers, reconditioned containers, containerboard, uncoated recycled paperboard, coated recycled paperboard, tubes and cores and a diverse mix of specialty products. We provide filling and packaging services such as warehousing and container life cycle management, which involves collection and recycling/reconditioning of used products, for a wide range of industries. Our subsidiary, Soterra, sustainably manages more than 175,000 acres of timberland in the Southeastern United States and offers land management services including consulting, wildlife stewardship, recreation and wetlands mitigation bank development. With operating locations in more than 35 countries, we are positioned to serve global as well as regional customers. Our operations, wherever we are in the world, follow The Greif Way. These principles guide our decisions and actions throughout our operations. We use financial, natural and human resources wisely without compromising the ability of future generations to meet their needs. Greif's Life Cycle Services (LCS) network across North America and Europe collects used and empty steel, plastic and Intermediate Bulk Container (IBC) rigid packaging products and recovered fiber and reconditions or recycles them to be suitable for reuse and resale. This work actively reduces the demand for raw materials and decreases the number of containers sent to landfills. In 2019, Greif acquired Caraustar Industries, Inc. expanding our manufacturing and service capabilities of high-quality recycled fiber materials and paper products. Greif is committed to creating sustainable products, across all product groups, from supply chain through end of life, lowering greenhouse gas emissions and meeting our customers' needs.

All statements, other than statements of historical facts, included in this report or incorporated herein, including, without limitation, statements regarding our future financial position, business strategy, budgets, projected costs, goals and plan and objectives of management for future operations, are forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended. Forward-looking statements generally can be identified by the use of forward-looking terminology such as "may," "will," "expect," "intend," "estimate," "anticipate," "project," "believe," "continue," "on track" or "target" or the negative thereof or variations thereon or similar terminology. All forward-looking statements speak only as of the date the statements we made. Although we believe that the expectations reflected in forward-looking statements have a reasonable basis, we can give no assurance that these expectations will prove to be correct. Forward-looking statements are subject to risks and uncertainties that could cause our actual results to differ materially from those projected. All forward-looking statements made in this report are expressly qualified in their entirety by reference to such risks and uncertainties. We undertake no obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data and indicate whether you will be providing emissions data for past reporting years.

Reporting year

Start date
November 1 2021

End date
October 31 2022

Indicate if you are providing emissions data for past reporting years
No

Select the number of past reporting years you will be providing Scope 1 emissions data for
<Not Applicable>

Select the number of past reporting years you will be providing Scope 2 emissions data for
<Not Applicable>

Select the number of past reporting years you will be providing Scope 3 emissions data for
<Not Applicable>

C0.3

(C0.3) Select the countries/areas in which you operate.

Algeria
Argentina
Austria
Belgium
Brazil
Canada
Chile
China
Colombia
Costa Rica
Czechia
Egypt
France
Germany
Greece
Guatemala
Hungary
Israel
Italy
Kenya
Malaysia
Mexico
Morocco
Netherlands
Norway
Poland
Portugal
Romania
Russian Federation
Saudi Arabia
Singapore
South Africa
Spain
Sweden
Turkey
Ukraine
United Kingdom of Great Britain and Northern Ireland
United States of America
Viet Nam

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Operational control

C-AC0.6/C-FB0.6/C-PF0.6

(C-AC0.6/C-FB0.6/C-PF0.6) Are emissions from agricultural/forestry, processing/manufacturing, distribution activities or emissions from the consumption of your products – whether in your direct operations or in other parts of your value chain – relevant to your current CDP climate change disclosure?

	Relevance
Agriculture/Forestry	Please select
Processing/Manufacturing	Please select
Distribution	Please select
Consumption	Please select

C-AC0.7/C-FB0.7/C-PF0.7

(C-AC0.7/C-FB0.7/C-PF0.7) Which agricultural commodity(ies) that your organization produces and/or sources are the most significant to your business by revenue? Select up to five.

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, a Ticker symbol	GEF

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual or committee	Responsibilities for climate-related issues
Board Chair	Board Chair (Position in corporate structure) Since 2016, Greif's entire Board has held responsibility for climate-related issues and sustainability. At each Board meeting, either Greif's CEO or Greif's Chief Marketing and Sustainability Officer reports to the Board. (Connection to climate change) At least one Board meeting annually is dedicated to discussing climate change and sustainability issues. Climate change topics that were raised to the Board and Board Chair in 2022 include GHG reduction targets and climate change trends and risks and opportunities. (Recent examples) The Board Chair actively engaged with climate-related issues throughout 2022. For instance, the Board reviewed the results of our workshop to identify climate-related market, regulatory and transition risks and their financial impact. We also provided a one-hour training to the Board on climate topics.
Chief Sustainability Officer (CSO)	The Chief Sustainability Officer (CSO) guides progress on the creation and implementation of Greif's climate targets, climate strategy and climate roadmap. The CSO participates in and oversees any work on climate risk. Additionally, the CSO scorecard for 2023 includes implementing at least two renewable energy projects. The CSO also works to identify and obtain the resources needed for Greif to achieve its climate targets.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – all meetings	Reviewing and guiding annual budgets Overseeing and guiding employee incentives Reviewing and guiding strategy Overseeing and guiding the development of a transition plan Monitoring the implementation of a transition plan Overseeing and guiding scenario analysis Overseeing the setting of corporate targets Monitoring progress towards corporate targets Reviewing and guiding the risk management process	<Not Applicable>	Greif's Board of Directors receives updates on sustainability and its ESG scores from either its CEO or Chief Marketing and Sustainability Officer at each quarterly Board meeting. Annually, one Board meeting is dedicated to a more in-depth discussion of sustainability issues, including climate change. Additionally, outside resources are asked to provide education and insight to the Board on ESG topics. The Board also holds the Sustainability Committee accountable for reaching annual goals and is responsible for determining the level of funding for Greif's sustainability programs. Greif's Executive Leadership Team (ELT) conducts quarterly reviews of Greif's progress on its climate targets, climate projects that are in progress, completed and/or planned and any climate related challenges Greif teams are facing. The ELT provides support in holding their teams accountable, communicating with key stakeholders and encouraging teams to hold monthly calls where progress against Greif's climate targets is discussed. In 2022, the ELT reviewed and approved an RFP for a VPPA developer in EMEA and approved the start of the work on term sheet negotiations. In addition, the ELT approved an onsite solar energy study in North America and the selection of sites in Illinois and California for the project. Additionally, some members of the ELT have reviewed Greif's scope 3 target analysis. In 2021, Greif completed a third-party scenario risk-based assessment and transition risk analysis, aligned with TCFD guidelines, to further understand our climate-related risks and opportunities. In 2022, Greif's risk management team began an assessment of the physical climate risks with a third party. We plan to circulate the results of this assessment in 2023. Feedback and guidance received from the Board is communicated to the Sustainability Steering Committee and used to drive Greif's strategies and implementation. Additionally, in 2022, Greif's new CEO announced its Build to Last Strategy with four strategic pillars, including the Protecting our Future pillar. This pillar focuses on developing a low carbon future and integrates Greif's climate focus into its corporate strategy, which the Board is responsible for overseeing.

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	Yes	Greif considers all of its Board to have competence on climate-related issues as it is regularly briefed on climate topics, including greenhouse gas emissions, targets, and scenario analysis. Additionally, outside resources are brought in to discuss ESG topics with the Board, including climate-related issues. For example, in 2022, our Executive Leadership Team reviewed and approved an RFP for onsite solar energy study in North America and the selection of sites in Illinois and California for the project. Additionally, some members of the ELT have reviewed Greif's scope 3 target analysis. Additionally, in 2022, Greif increased Board oversight through climate engagement and education to bolster our governance practices. This engagement raised awareness of the importance of climate risks and emerging trends that could impact the future of the packaging sector.	<Not Applicable>	<Not Applicable>

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Position or committee
Other C-Suite Officer, please specify (Chief Marketing and Sustainability Officer)

Climate-related responsibilities of this position
Managing annual budgets for climate mitigation activities
Developing a climate transition plan
Implementing a climate transition plan
Integrating climate-related issues into the strategy
Conducting climate-related scenario analysis
Setting climate-related corporate targets
Monitoring progress against climate-related corporate targets
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities
<Not Applicable>

Reporting line
Reports to the board directly

Frequency of reporting to the board on climate-related issues via this reporting line
Annually

Please explain
Greif's Board of Directors receives annual updates from its Chief Marketing and Sustainability Officer (CM&SO). This role assumes responsibility for leading climate change efforts and sustainability across Greif. Greif's aim is to further embed sustainability into its business strategy and the company believes that the individual in this role is strategically positioned to do so. This role is also part of Greif's Sustainability Steering Committee (SSC), which includes ten representatives from Greif's Executive Leadership Team (ELT) and seven representatives from the Sustainability Management Team (SMT). The SSC is tasked with further integrating sustainability and climate change into our strategy and operations, reviewing our sustainability- and climate-related progress and priorities quarterly and ensuring accountability at all levels of our organization. In addition to this individual, the SSC includes members of Greif's Executive Leadership Team, President and CEO; Executive Vice President, CFO; Executive Vice President, Chief Human Resources Officer; Executive Vice President, General Counsel and Secretary; Vice President and Group President of Global Industrial Packaging; Vice President and Group President, Senior Vice President and Group President, Paper Packaging and Soterra LLC; Senior Vice President, Chief Supply Chain Officer; Senior Vice President, Global Operations Group; Chief Marketing and Sustainability Officer; Vice President, Corporate Development and Investor Relations; Chief Information and Digital Officer; and VP of Sustainability.
The SSC, which is subject to Board oversight, was formed including Senior leadership to signal to the organization and its stakeholders the importance of climate change, ensure an enterprise view of climate change, accelerate progress of initiatives and ensure the SSC has the authority to implement change in the organization. The Board of Directors holds the SSC accountable for reaching annual goals, which directly impacts the remuneration of the CM&SO and VP of Sustainability and determines the level of funding for Greif's climate change programs.
The SSC guides the activities of the SMT, which works with topic teams, including the Global Climate Team, consisting of representatives from each region and business unit to drive operational projects and priorities. The SMT meets quarterly with the ELT to review progress against goals through energy and emission performance dashboards and facility level roadmaps detailing energy and emission reduction initiatives that are active in Greif facilities and reports meeting outcomes to CM&SO and VP of Sustainability. Greif's VP of Sustainability meets quarterly with Greif's CEO, CFO and other members of the ELT to discuss progress of climate initiatives and funding required for energy and emissions reduction projects. Additionally, the CM&SO and VP of Sustainability meet with the CEO quarterly.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive
Procurement manager

Type of incentive
Monetary reward

Incentive(s)
Bonus – set figure

Performance indicator(s)
Progress towards a climate-related target
Achievement of a climate-related target
Increased engagement with suppliers on climate-related issues
Company performance against a climate-related sustainability index (e.g., DJSI, CDP Climate Change score etc.)
Other (please specify) (Analysis of Greif's scope 3 emissions)

Incentive plan(s) this incentive is linked to
Short-Term Incentive Plan

Further details of incentive(s)
Environmental criteria included in purchases

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan
Part of Greif's new Sustainability Supply Chain Manager performance review is based on their ability to lead Greif's Procurement Sustainability projects to ensure / hold to account we are meeting Greif's 2025 and 2030 sustainability goals. The Sustainable Supply Chain Manager is responsible for identifying and selecting suppliers of renewable energy and lower-carbon raw materials, analysis of our scope 3 emissions and evaluation of our suppliers through EcoVadis. Many of Greif's buyers are working on specific sustainability projects, for example sourcing more recycled materials.

Entitled to incentive
Corporate executive team

Type of incentive
Non-monetary reward

Incentive(s)
Internal company award

Performance indicator(s)
Progress towards a climate-related target
Implementation of an emissions reduction initiative
Increased engagement with suppliers on climate-related issues

Incentive plan(s) this incentive is linked to
Not part of an existing incentive plan

Further details of incentive(s)
Progress against energy reduction target

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan
Greif's progress against our energy reduction target is tracked and evaluated at the CEO, executive leadership team and regional leadership levels. One member of Greif's corporate executive leadership team, our Chief Marketing and Sustainability Officer, is tasked with creating and implementing climate-related projects and targets. This individual's performance is evaluated in part on their ability to execute climate-related projects successfully to drive progress towards our climate commitments.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?
Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	3	
Medium-term	3	5	
Long-term	5	10	

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

Definition of Substantive Financial or Strategic Impact:

Greif defines substantive financial or strategic impact as any impact that exceeds $1M in a given year. Greif further classifies substantive financial impacts as follows: Low = less than $50M, moderate = between $50M and $100M, and high = greater than $100M. Risks that fall below the above threshold but are significant due to customer, operational or regulatory demands are also considered as part of Greif's ongoing risk management process and prioritized based on potential financial impact and likelihood of occurrence. As part of this process, Greif evaluates climate risks including policy and legal, market, technology, reputation, and acute and chronic physical risks using the TCFD framework.

Description of Quantifiable Indicators used to Define Substantive Financial or Strategic Impact:

(Potential financial impact to Greif's operations) Financial impacts are estimated in varying ways, serving as quantifiable indicators and depending on the type of risk or opportunity that is being analyzed. Some methods include TCFD-aligned scenario analysis, assessment of historical financial impact ranges from similar events, and expert assessment. Financial impacts are assessed over short-, medium-, and long-term time horizons to contextualize findings. In Greif's climate physical risk analysis the severity of financial impact was defined across 5 categories, category 1 being the least severe and category 5 the most severe. Inputs covering financial loss, impact to business and action plan were evaluated across all 5 categories.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered
Direct operations
Upstream
Downstream

Risk management process
Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment
More than once a year

Time horizon(s) covered
Short-term
Medium-term
Long-term

Description of process
The process used to determine which risks and opportunities could have a substantive financial or strategic impact on the organization:
Climate-related risks and opportunities are integrated into Greif's Enterprise Risk Management (ERM) process, which considers all Greif Business Units and geographies and risks and opportunities that present themselves in the company's direct operations and upstream and downstream from the company's direct operations. Climate-related risks and opportunities are evaluated by the Sustainability Steering Committee (SSC) several times a year as they come to the attention of committee members. Risks and opportunities that are considered sufficiently large and/or likely when compared against Greif's ERM framework are brought to the attention of senior leaders. In addition to its regular meetings, the SSC is periodically informed about the results of in-depth analyses of climate-related risks and opportunities and takes decisions based on the severity of the risks or size of the opportunities.
(Identifying and assessing) In 2021, Greif held workshops with stakeholders from across all primary business units and functional areas led by the Head of Strategy and Sourcing, an Executive Leadership Team (ELT) member. During the workshops, inter-disciplinary groups were formed to analyze individual climate-related risk and opportunity categories that may affect Greif. For instance, one group of members from varying business units and functional areas solely analyzed the potential market risks (i.e., shifting customer preferences or lack of raw material supply) that may arise from a transition to a low-carbon economy. Risks and opportunities are considered across all of the categories enumerated by the TCFD (e.g., market, policy and legal, reputation, technology, acute and chronic physical, etc.) and across the short- (0-3 years), medium- (3-5 years), and long-term (5-10 years). After individual groups conducted their assessment of particular risk and opportunity categories, they were brought together to create an extended registry of all risks and opportunities that were identified in the workshops. Risks and opportunities in the registry were aggregated, when possible, and prioritized based on their expected impact to Greif's operations as well as the likelihood of their occurrence. Those that were deemed the most likely and/or impactful to Greif's business were modelled quantitatively using publicly available financial data, socio-economic data from publicly available climate change scenarios (e.g., scenarios from the International Energy Agency), and industry reports to gather a directional understanding of the magnitude of each risk and opportunity. The analyzed risks and opportunities were then categorized as either minor, moderate, severe or critical based on their potential financial impact and perceived likelihood of occurrence. Risks and opportunities were brought to the attention of senior decision makers if their placement within the ERM framework's materiality threshold warranted continued consideration.
In 2022, Greif socialized the findings from the workshops. The findings were shared with various parts of the company including the Risk Leader Committee (RLC). As a result of the climate risk workshops, Greif now lists all climate-related risks in company ERM documents that are shared with the RLC.
(Responding) Greif has made strategic decisions because of this climate-related risk analysis; it is determined to grow both its collection/recycling/reconditioning network and its portfolio of recycled raw materials. Greif developed its 2030 targets in 2022 and for the first time included circularity targets in addition to a zero-waste target; circularity and zero-waste targets were influenced by the results of the climate-related risks workshops. Additionally, in 2022, Greif conducted a similar process to identify the company's physical climate risks. The process was led by the risk management team and conducted with support from a third party. The results of the physical climate risk assessment are being circulated in 2023.
How your organization makes decisions to mitigate, transfer, accept or control the identified climate-related risks and to capitalize on opportunities:
Risks and opportunities that have gone through the above process and have been deemed considerable enough to warrant action are brought to the attention of the RLC, CEO, and CFO by the VP of Sustainability. The RLC meets quarterly and is responsible for analyzing emerging risks and opportunities within Greif's business. The RLC evaluates risks and opportunities in conjunction with the Audit Committee of Greif's Board of Directors to determine the most critical risks and identify areas of opportunity within them. Quarterly, the RLC reports to the Audit Committee and, when appropriate, the Audit Committee chair reports on risk management topics to the full Board of Directors. The top 15 risks, as assessed by the RLC using the financial and likelihood thresholds established in the ERM framework, are assigned to a risk owner, a subject matter expert responsible for informing business units of these risks and reporting on mitigation activities to the RLC, regularly, and the Audit Committee, when appropriate. The RLC evaluates whether risk mitigation is appropriate to reduce risk to an acceptable level or requires further mitigation. When further mitigation activities are warranted, the risk owner is notified and monitored by the RLC to ensure that the mitigation process proceeds as planned.
Case Study:
(Situation) Carbon pricing was identified as a key risk to Greif's business during the inter-disciplinary workshops that inform the SSC, as it was deemed to be very likely to increase in both prevalence and size across Greif's operating regions in the near future. While Greif is already taxed under the EU ETS, workshop teams feared that carbon pricing may occur within the broader North American context that Greif operates in as well. (Task) In order to reduce exposure to current and potential future carbon pricing mechanisms, Greif had to isolate potential levers that could be used to reduce the GHG intensity of its products. (Action) Greif tasked facility operators and engineers with assessing the scope of potential efficiency enhancements that could reasonably be conducted at each site. (Result) Greif conducted 23 energy efficiency projects in 2021, and 45 in 2022 and achieved 11million kWh and 13 million kWh of annual energy savings, respectively. In 2022, to better identify energy efficiency opportunities, Greif also conducted energy audits of all our Latin American (LATAM) facilities. The study identified 447 focus areas, the top five accounting for 85 percent of our total energy reduction opportunities within the LATAM region. Greif is developing roadmaps to reduce energy consumption based on our findings. The projects identified are being implemented in 2023.

C2.2a

(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Relevance: As an organization with operations across the globe, current regulations such as carbon taxes, cap and trade programs, and reporting requirements are considered as part of Greif's ongoing climate-related risk assessments. Each Regional VP is responsible for monitoring the regulatory environment and ensuring their operations are compliant with all applicable regulations. The Sustainability Steering Committee (SSC) is responsible for maintaining awareness of climate-related regulations globally and helping to identify risk and opportunity within these regulations, based on input from Regional VPs and the Risk Leadership Committee. Current regulatory risks are discussed at SSC meetings. Climate-related regulatory risk is incorporated into Greif's Enterprise Risk Management process, which is reviewed quarterly by Greif's Audit Committee and members of the Executive Leadership Team (ELT), and annually by Greif's Board of Directors. Specific Example: A recent risk assessment found that carbon pricing mechanisms in the EU and in other markets that Greif or its suppliers operate in are a material risk to Greif as they impose additional operating costs above and beyond those already incurred in the normal course of business. In 2022, Greif paid €87,749 ($95,833) in carbon taxes in Sweden to account for emissions from its local facilities in the country. Swedish emissions account for 0.17% of Greif's overall Scope 1 emissions globally. To respond to this risk, Greif's facility managers have undergone efficiency assessments to reduce emissions at the site level. Their findings have been provided to the SSC, which will use this data to inform future roadmaps for efficiency enhancement projects.
Emerging regulation	Relevant, always included	Relevance: Emerging regulations, like new and strengthening carbon pricing mechanisms or increased disclosure requirements, are considered as part of Greif's ongoing climate-related risk assessments. Additionally, emerging regulations and disclosure requirements are considered as part of regulatory risks in Greif's top 15 risks in its enterprise risk management process. Each Regional VP is responsible for monitoring the regulatory environment in their region and notifying executive leadership of emerging changes. The SSC is notified when regulatory changes with potential climate-related impacts are identified by regional VPs and the Vice President of Sustainability. Emerging regulatory risks are discussed at SSC meetings. Climate-related regulatory risk is incorporated into Greif's ERM process, which is reviewed quarterly by Greif's Audit Committee and members of the ELT, and annually by Greif's Board of Directors. Specific Example: Greif actively monitors the status of carbon pricing mechanisms across North America due to its emissions concentration on the continent (93% of Greif's Scope 1 emissions occur in North America). While, at present, a strong cap and trade program exists in California and a growing carbon pricing mechanism exists in Canada, shifting requirements for inclusion in either system or new carbon pricing schemes in other North American markets could lead to new and substantial operating costs for Greif. Specifically, 92% of Greif's emissions in North America occur in locations where Greif does not currently make payments in accordance with a carbon pricing scheme. Given this concentration of emissions outside of regulated areas, carbon prices in North America could have a substantial impact on Greif's operations. For example, a $100/MT CO2e would generate a risk sufficiently large to be considered 'moderate' in the financial thresholds documented in Greif's ERM framework. In order to mitigate exposure to potential carbon pricing, Greif has set greenhouse gas reduction targets for both direct and indirect emissions and has undergone the evaluation of emissions reduction opportunities across several of its North American facilities.
Technology	Relevant, always included	Relevance: Pressure from customers to reduce product life-cycle emissions has spurred competition among industrial packaging companies in the development of technologies and processes that reduce packaging product GHG emissions. Competition and climate risk are among Greif's top 15 risks in Greif's enterprise risk management process. Examples along the value chain include low-carbon and/or recycled inputs, higher-efficiency production processes, and the use of innovative distribution network technologies. To mitigate this risk, Greif engages customers daily to ensure the company remains abreast of concerns. Greif tracks a Customer Satisfaction Index and Net Promotor Scores annually to ensure it is addressing customer needs and uses feedback to monitor emerging concerns. Greif collaborates with customers on product development and innovation efforts to help meet their sustainability goals. These efforts have led to a variety of products, including NexDrum and EcoBalance that increase the use of recycled materials, reduce weight and emissions compared to conventional products. Specific Example: If Greif is unable to utilize innovative technology and processes to reduce product lifecycle emissions, it may begin to lose business with companies seeking to decarbonize their supply chain. 20% of Greif's top 50 customers have announced a Scope 3 decarbonization goal that includes their supply chain, aligned with the Science-based Targets Initiative. Greif stands to lose substantial revenue if these companies choose to change packaging suppliers to reach their decarbonization goals. In response to this risk, Greif business units have focused their efforts on innovative technological advances that reduce product emissions. Greif Sweden/Nordic developed the capability to replace ink jet markings with laser markings on Intermediate Bulk Containers, reducing the use of solvent-based ink during production. By eliminating the use of solvents and ink, resin use in production decreases by 6.7% which reduces the product's GHG footprint. Annually, Greif's Climate Team oversees the development of operational energy and emissions roadmaps to identify projects that will contribute to climate-related goals like the one mentioned above. This information is incorporated into Greif's ERM process and progress against the goals is discussed at each quarterly SSC Meeting. In 2022, Greif completed 45 projects, reducing energy consumption by over 13 million kWh, annually.
Legal	Relevant, always included	Relevance: As a public industrial company that operates globally, Greif is currently, and may increasingly become, subject to legal requirements around disclosure of climate risks and opportunities as well as climate metrics. Failure to comply with climate-related legal obligations may lead to litigation claims against Greif which could drive significant risks to its business. Regulatory risk, which includes climate regulatory risk, is one of the top 15 risks Greif tracks and assesses quarterly. Greif's legal team formed a steering committee in 2022 to monitor ESG regulatory requirements more closely and inform the company about upcoming regulatory requirements. Specific Example: The SEC recently published a draft disclosure rule that may require the disclosure of greenhouse gas data, and a breakdown of climate-related costs to the business. Failure to comply with the SEC's potential disclosure ruling may lead to climate-related litigation claims against Greif, since it is publicly traded on a stock exchange in the United States.
Market	Relevant, always included	Relevance: Greif has witnessed a rise in customer and investor expectations around GHG reductions and the development of innovative, low-carbon products. As a provider of upstream products in its customers' value chains, Greif's business is prone to scrutiny from customer-led supply chain decarbonize efforts. As such, market shifts driven by GHG and climate change concerns pose a significant business risk to Greif. Thus, Greif has a vested interest in delivering on climate goals and appropriately disclosing the company's progress and initiatives. In 2020, Greif's materiality assessment identified climate strategy as one of the most important topics to internal and external stakeholders. Based on this assessment, the Greif Executive Leadership team reviewed and updated its strategy in 2022 to integrate high-priority climate topics, including climate strategy, into the overall business strategy. Specifically, the Protecting our Future pillar of our Build to Last strategy focuses on decarbonization and circularity. Greif also developed a new goal to reduce absolute Scope 1 and 2 GHG emissions 28 percent over a 2019 baseline by 2030, and intends to complete an assessment of Scope 3 emissions and the feasibility of a long-term net zero emissions aspiration by the end of 2023. Specific Example: Failure to meet Greif's stated GHG reduction targets may lead to a market disadvantage relative to peers. Reactions to this may cause loss of business from customers seeking to decarbonize their supply chain or a reduction of investment in Greif from climate- and sustainability-focused investors. In response, Greif undertook 45 GHG reduction initiatives in 2022 to lower its operational and product GHG footprint by 3,861 MT. To capitalize on its initiatives and highlight its consideration of climate topics, Greif publishes annual sustainability reports in accordance with GRI Standards Core requirements. Greif continuously updates its sustainability reports to align with emerging and influential disclosure frameworks, including recommendations from the Task Force on Climate-related Financial Disclosure (TCFD). Greif joined the board of the Alliance to End Plastic Waste (AEPW) in 2021 to expand our commitment to reducing waste and promoting a circular economy. We aim to bring the industrial packaging perspective to the group and partner with customers and other organizations to bolster our circular economy strategy.
Reputation	Relevant, always included	Relevance: Acknowledgment and management of climate risk is increasingly becoming an expectation. Some of our reputational risk is driven by growing customer awareness around the detrimental impacts associated with packaging and the desire to have carbon neutral and circular solutions. As such, Greif has a vested interest in both delivering on climate goals and appropriately disclosing the company's progress and initiatives to key stakeholders. Specific example: In addition to other factors, Greif considers customer perception in its risk assessment process, as a negative reputation on climate issues may lead to reduced sales. To respond to this risk, Greif publishes an annual sustainability report which outlines Greif's stance and progress on a number of important climate topics as well as shares relevant greenhouse gas metrics for use by stakeholders. In regard to initiatives, Greif provides clear publicly-available information about programs, including the Green Tool. The Greif Green Tool is a flexible calculator that uses independent lifecycle data of Greif industrial packaging products – designed to assist our customers in making informed decisions about which industrial packaging best suits their products and to achieve their sustainability goals. The Green Tool allows customers to review and compare the environmental impact of plastic drums, steel drums, IBCs, fibre drums and big bags specifically related to their business. Results can be used to create an environmental baseline and help customers make meaningful comparisons between different packaging types and track their progress over time. To supplement the Greif Green Tool, we launched the Greif Green Tool Lite, which allows us to provide information more quickly to our customers. The Greif Green Tool Lite provides carbon footprint and reduction metrics that our customers can achieve by switching to a more sustainable product.
Acute physical	Relevant, always included	Relevance: Greif's business relies on the steady procurement of raw materials, the timely and efficient production of finished goods, and the transportation of those goods to their intended market. Acute physical risks can disrupt all of these phases of Greif's operations by, for example, taking suppliers' facilities offline and creating a lag in input production, by damaging Greif's manufacturing facilities, or by disrupting the transportation of Greif's finished products to its customers. As such, Greif routinely evaluates the role of acute physical risks in all aspects of its business to ensure operations are robust against likely eventualities. Specific example: Greif considers the possibility of extreme wind storm events as part of its risk assessment process. For example, in 2020 Greif Paper Packaging & Services' Tama facility experienced a derecho (i.e., a widespread and long-lived windstorm) that took the facility offline for a week. Greif's Sweetwater and Los Angeles facilities covered the necessary supply to continue meeting customer demand. When repairing the damage to the roof, Greif used upgraded decking materials to make the roof stronger. Greif also upgrades its facilities to improve their resilience should they be impacted by wind events again in the future. Additionally, Greif is in the process of implementing risk-based cost allocations, which will use a site's relative risk as a rate factor for how the facility allocates costs to promote loss control investment, and better mirror cost generation. Additionally, in 2022, Greif conducted a physical climate risk analysis. The results of this assessment are being socialized in 2023 with the goal of arriving at specific action items Greif can take to better prepare and protect the facilities most at risk, develop business continuity plans and integrate the results into strategic decision making such as acquisitions decisions.

	Relevance & inclusion	Please explain
Chronic physical	Relevant, always included	Relevance: Greif's business relies on the steady procurement of raw materials, the timely and efficient production of finished goods, and the transportation of those goods to their intended market. Chronic physical risks can disrupt all these phases of Greif's operations by, for example, interrupting either Greif's or its suppliers' operations because of chronic weather patterns that surpass the engineering threshold of key elements of production facilities or water stress making the production and transportation of upstream raw materials more difficult. As such, Greif routinely evaluates the role of chronic physical risks in all aspects of its business to ensure operations are robust against likely eventualities. In 2022, Greif conducted a physical climate risk analysis. Specific example: As climate change leads to gradual changes in key climate variables, our physical climate risk analysis considered current and future climate-related physical risks related to heat stress associated with high levels of air temperature and humidity. We assessed the likelihood and/or intensity of hazards where applicable across our global footprint. Under the current climate scenario through 2030, 23% of our asset value is exposed to High Heat Stress, experiencing 80 day or more in heat waves per year. Under the high emissions scenario, this increases to 64% of our asset value exposed to High Heat Stress. The results of this assessment are being socialized in 2023 with the goal of arriving at specific action items Greif can take to better prepare and protect the facilities most at risk, develop business continuity plans and integrate the results into strategic decision making such as acquisitions decisions.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Risk 1

Where in the value chain does the risk driver occur?
Direct operations

Risk type & Primary climate-related risk driver

Current regulation	Carbon pricing mechanisms

Primary potential financial impact
Increased direct costs

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
One of Greif's main regulatory risks as a producer of industrial packaging products in North America and the EU is the potential additional cost imposed on operations, either through direct payments or pass-through costs from regulated suppliers and energy companies, by carbon pricing mechanisms like the EU ETS. Currently, 3% of Greif's Scope 1 emissions are subject to carbon pricing under the EU ETS. Greif's exposure to the EU ETS is mostly limited to its Global Industrial Packaging (GIP) operations as the business unit's main manufacturing facilities are located in the EU. Carbon pricing under the ETS may lead to a competitive disadvantage when competing against non-EU based manufacturers of rival products. To mitigate this risk, Greif has undertaken a number of energy efficiency programs throughout the last several years, which has had the dual benefit of lowering energy costs as well as reducing exposure to carbon pricing mechanisms.

Time horizon
Long-term

Likelihood
Likely

Magnitude of impact
High

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure – minimum (currency)
23000000

Potential financial impact figure – maximum (currency)
177000000

Explanation of financial impact figure
(Context) This financial impact range reflects the cost of carbon pricing in the IEA's NZE scenario in 2040 applied to Greif's operations.

(Approach) 1) Greif's emissions profile was projected until 2040 under two scenarios: one in which emissions keep pace with assumed long-term business growth, and one in which all current and proposed site-level emissions reduction programs are instituted, and emissions growth is somewhat decoupled from business activity; 2) the IEA's STEPS and NZE carbon pricing is applied to Greif's Scope 1 emissions on the country-level; 3) carbon pricing is aggregated company wide.

(Explanation of cost calculation) Specifically, the maximum potential impact figure above was calculated by multiplying Greif's forecasted emissions from advanced and developing economies in 2040 (845k MT CO2e and 26k MT CO2e, respectively) by the carbon prices associated with those two regions in the IEA's NZE Scenario ($205 and $160 per MT CO2e, respectively). The minimum financial impact to Greif is calculated by multiplying the same carbon prices by region ($205 and $160 per MT CO2e) by Greif's forecasted emissions under a scenario in which emissions reductions occur in line with a 1.5-degree aligned GHG reduction target (107k MT CO2e in advanced economies and 3k MT CO2e in developing economies). Maximum financial impact: ($205* 845,000 MT CO2e) + ($160* 26,000 MT CO2e) = ~$177,000,000. Minimum financial impact: ($205 * 107,000 MT CO2e) + ($160 * 3,000 MT CO2e) = ~$23,000,000.

(Assumptions) 1) Greif's business is assumed to grow at the same rate as the IEA's GDP forecast for the markets it operates in; 2) emission reduction programs are assumed to be exactly as effective as estimated; 3) no new emission reduction initiatives are introduced from now until 2040; and 4) the carbon prices introduced in the IEA's NZE scenario are implemented.

Cost of response to risk
135345000

Description of response and explanation of cost calculation
(Description of response) Greif proactively manages its exposure to carbon pricing mechanisms by systematically increasing the energy efficiency of its operations, creating new, less energy-intensive products. In the future, Greif may also utilize zero-carbon energy sources to reduce the emissions associated with its products.

(Case Study) Greif seeks to make continuous energy efficiency improvements when they are economically feasible to reduce the company's exposure to carbon pricing mechanisms. To that effect, Greif conducted and fully implemented 45 energy efficiency projects in 2022 that reduced annual energy consumption by 13 million kWh.

(Explanation of cost calculation) The above cost of response is composed of the cost of all current and proposed mitigation activities that Greif has begun or compiled to reduce its exposure to carbon pricing mechanisms. This includes the cost of consultancy ($275k), the estimated cost of onsite solar site selection and strategy development ($50k), the costs associated with all possible facility-level energy efficiency enhancements for Greif's Paper Packaging and Services (PPS) business unit ($135MM), and additional staff and software costs ($20k). Therefore, $275K + $50K + $135,000K + $20K = $135,345K. Notably, the above figure is a gross cost and does not consider the savings associated with reduced energy consumption.

Comment

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Opp1

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
As a producer of industrial packaging, Greif has an opportunity to benefit from an increased supply of recycled products that can be reconditioned and resold, resulting in increased revenues. Climate-related market dynamics are expected to lead to an increase of both recycled plastic and steel supply as recycled and reconditioned products require fewer emissions to sell back into production compared to their virgin counterparts. For several years, Greif has been expanding its recycling and reconditioning efforts and is poised to benefit from an increase in corporate adoption of recycling programs. This is particularly true in European operations where Greif already has robust recycling operations. In 2022, Greif recycled and reconditioned approximately, 337 thousand PE drums, 1.7 million steel drums, and 726 thousand IBCs.

Time horizon
Medium-term

Likelihood
Virtually certain

Magnitude of impact
High

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure – minimum (currency)
225000000

Potential financial impact figure – maximum (currency)
299000000

Explanation of financial impact figure
(Context) This financial impact value is representative of Greif's estimated growth in reconditioned Polyethylene (PE) drum, steel drum, and Intermediate Bulk Container (IBC) sales in 2040.

(Approach) 1) PE drum, steel drum, and IBC recycling rates for European operations were projected into the future based on the IEA's steel and plastic recycling figures; 2) historical data was used to derive the proportion of recycled materials that could be reconditioned and sold; and 3) revenue was estimated by applying per-unit prices to the derived reconditioned material volume.

(Explanation of cost calculation) The Maximum financial impact is calculated as the projected amount of reconditioned steel drums, PE drums, and IBCs that Greif will have access to in a net zero scenario multiplied by an average per-unit cost. Therefore, the maximum financial impact is as follows: (4,293,178 reconditioned steel drums * average per-unit cost) + (164,272 reconditioned PE drums * average per-unit cost) + (1,187,135 reconditioned IBCs * average per-unit cost) = ~$299,000,000. The minimum financial impact figure is similarly calculated by multiplying the amount of reconditioned steel drums, PE drums, and IBCs that Greif will have access to in a business-as-usual scenario multiplied by an average per-unit cost. Therefore, the minimum financial impact is as follows: (3,161,839 reconditioned steel drums * average per-unit cost) + (124,423 reconditioned PE drums * average per-unit cost) + (899,164 reconditioned IBCs * average per-unit cost) = ~$225,000,000.

(Assumptions) 1) The percentage of recycled materials that were successfully reconditioned and sold was assumed to stay constant at the historical average; 2) per-unit prices for reconditioned products were assumed to stay constant and at the historical average; and 3) corporate recycling is assumed to scale at the same rate as global recycling in the IEA's NZE scenario.

Cost to realize opportunity
204600000

Strategy to realize opportunity and explanation of cost calculation
(Strategy to realize opportunity) Greif's primary strategy to realize the opportunity provided by the increasing demand for refurbished products is to grow its existing Life Cycle Services (LCS) business, which currently refurbishes, and ultimately resells steel drums, PE drums, and IBCs back to customers or recycles containers unable to be reconditioned or resold.

(Case Study) -Situation- To capitalize on the above opportunity, Greif's reconditioning business has needed to scale in size and efficiency. -Task- A key factor in meeting the demand for refurbished products is the ability to recondition a large percentage of the materials that are recycled as supply is limited. -Action- To improve its efficiency, Greif sought to improve its ability to refurbish reconditioned materials through customer engagement and process improvements. -Result- Greif's actions increased the rate at which reconditioned IBCs were refurbished and sold instead of scrapped for parts from 66% in 2017 to 91% in 2022, thereby allowing Greif to help meet the growing demand for reconditioned, lower-carbon products.

(Explanation of cost calculation) The above figure includes the cost of business unit expansion ($200MM), demand research ($50k), extra staffing costs ($150k), and the cost of three additional operating lines ($4.4MM). Therefore, $200,000k + $50k + $150k + $4,400k = $204,600k.

Comment

C3. Business Strategy

C3.1

(C3.1) Does your organization's strategy include a climate transition plan that aligns with a 1.5°C world?

Row 1

Climate transition plan

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a climate transition plan within two years

Publicly available climate transition plan

<Not Applicable>

Mechanism by which feedback is collected from shareholders on your climate transition plan

<Not Applicable>

Description of feedback mechanism

<Not Applicable>

Frequency of feedback collection

<Not Applicable>

Attach any relevant documents which detail your climate transition plan (optional)

<Not Applicable>

Explain why your organization does not have a climate transition plan that aligns with a 1.5°C world and any plans to develop one in the future

Greif currently does not have a climate transition plan that aligns with a 1.5°C world since it has focused its efforts over the past several years on developing a framework to achieve the, then best practice standard, of a well-below 2°C world. That said, aspects of Greif's climate strategy are 1.5°C-aligned. For instance, Greif's recent scenario analysis made use of the IEA's NZE scenario to assess the magnitude of transitional impacts on Greif's business in a 1.5°C world. Additionally, Greif intends to create a 1.5°C-aligned transition plan within the next two years to keep pace with current best practice and holistically assess the company's exposure the climate-related risks and opportunities.

Explain why climate-related risks and opportunities have not influenced your strategy

<Not Applicable>

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, qualitative and quantitative	<Not Applicable>	<Not Applicable>

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Transition scenarios: IEA NZE 2050	Company-wide	<Not Applicable>	(Parameters) Carbon pricing data, GDP, sectoral carbon budgets, oil and gas volume and prices. (Assumptions) Linear interpolation was used to create data for years that were not covered in the IEA. (Analytical choices) Climate-related impacts were assessed through 2040, and publicly available financial data and industry reports were used to contextualize climate impacts.
Physical climate scenarios: RCP 7.0	Company-wide	<Not Applicable>	(Parameters) Extreme weather events such as cyclones or flood and gradual changes in key variables such as temperature, humidity and precipitation. (Assumptions) Modelled scenarios considered varied societal controls, emission levels and associated temperature change. Physical risk exposure ratings are based on only climate fluctuation. (Analytical choices) Climate-related impacts were assessed for the short, medium and long-term between 10-80 years for relatability with asset lifespans.

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

(Focal question 1) What are the most pertinent climate-related risks to Greif's business?
(Focal question 2) Where along Greif's value chain are climate-related risks concentrated?
(Rationale for selecting scenarios disclosed in 3.2a) Greif used the IEA's NZE 2050 scenario to understand the upper bound of potential transition risks that the company and its value chain may face. By using the most ambitious scenario offered by the IEA, Greif also hoped to analyze risks that may not have been as apparent under less ambitious scenarios and thereby form a comprehensive understanding of climate-related transition risks that the company may face in the future. Furthermore, Greif utilized a bespoke physical risk scenario in order to contextualize potential physical impacts from climate change along its unique value chain and thereby derive decision-useful data for use in its climate strategy.

Results of the climate-related scenario analysis with respect to the focal questions

(Summary of results) -Answer to Focal Question 1 - Greif's recent scenario analysis further highlighted the importance of market, regulatory, reputational, and physical risks for Greif's business and across all parts of its value chain. Select company specific examples include failure to meet Greif's stated GHG reduction targets leading to a market disadvantage relative to peers and sea level rise that may impact Greif's facilities that are in low-lying coastal areas. Our scenario analysis determined that 46 assets making up 15% of our total asset value are exposed to very high levels of coastal flood and sea level rise. Answer to Focal Question 2- An example of key risks that Greif analyzed through the scenario analysis process are those that stem from the greenhouse gasses associated with Greif's products. This is both a regulatory and market risk. (Regulatory) Greif may face increasingly severe carbon pricing in the future, especially in North American markets where the majority of Greif's Scope 1 emissions occur, thereby increasing the costs associated with carbon-intensive processes both in its operations and upstream through increased input prices. (Market) Greif's downstream customers are increasingly establishing targets to reduce the emissions in their supply chain which could lead to a loss of business if Greif does not continue to meet their environmental standards in the future through efforts, such as the 45 GHG reduction initiatives undertaken by Greif in 2022 to lower the GHG footprint of its operations and products by 3,861 MT CO_2e.

(How results have informed Greif's actions, business strategy, and financial planning) In order to reduce its exposure to carbon pricing mechanisms and pre-empt customer demands for reduced emissions and in response to regulatory and market risks identified through our scenario analysis, Greif established a greenhouse gas reduction target in 2021: to reduce Scope 1 and 2 emissions by 28% by 2030 relative to a 2019 baseline. To achieve this goal, Greif has focused its efforts on systematically increasing the efficiency of its facilities, as well as by developing low-carbon products in partnership with its customers. For example, Greif conducted 45 efficiency enhancement projects in 2022 that are expected to reduce total annual energy consumption by 13 million kWh per year. Additionally, Greif is currently updating its roadmap to achieve its greenhouse gas reduction target to keep it aligned with current best practices as new opportunities for emissions reductions emerge.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	The climate-related risks and opportunities that Greif has identified through scenario analysis impact the manufacturing and delivery of products and services through the company's efforts to monitor and reduce volatility in input costs; to hedge against the risk of business interruption due to changing weather patterns; to mitigate product, and service price increases due to carbon pricing schemes; as well as the creation of lower-carbon products to meet changing customer preferences. Input price volatility: Mitigating raw material price volatility is one of the primary goals of Greif's efforts to lightweight and downgauge each product line. The core of this effort is reducing the amount of virgin raw materials used in Greif products, which directly impacts exposure to this risk. Downgauging results in raw material cost savings and has proven an effective means of rationalizing exposure to upstream petrochemical suppliers. Carbon pricing & energy efficiency: Each Greif product benefits from energy efficiency programs because of lowered operating expenses impacting overall cost of production. Since each facility is expected to identify and complete energy efficiency projects each year, all product lines benefit from this opportunity. In 2022, we completed 45 projects, leading to a 13 million kWh reduction in annual energy consumption. Shifting customer preferences: Changes in customer preferences towards low emission packaging require changes to Greif's products to remain competitive. Greif has identified 8 sustainability criteria to factor into new product development, set sourcing goals for green material inputs and launched numerous products. Revenue from Greif's sustainability-tagged products and services totalled $1.0BN, 24% of total revenue from sustainable products and services in 2022. Greif's products and services are impacted by the company's reputation to the extent that we can effectively communicate and prove the benefits to the market/customers. Additionally, the Greif Green Tool allows its customers to identify the emission impact of their selected Greif products in their value chain, including raw materials, production, transportation, and end-of-life, and evaluate the benefits of moving to low/lower carbon products. Over the last year, we have seen a 69 percent increase in requests for the use of the Greif Green Tool.
Supply chain and/or value chain	Yes	The risks and opportunities identified through scenario analysis are integrated into Greif's efforts to engage it suppliers to reduce upstream emissions through logistical and efficiency enhancements, as well as to meet changing customer preferences by pushing suppliers to implement sustainable material sourcing practices. Supplier engagement: Greif's innovation efforts offer positive impact to its customers, who may experience lowered prices (for Greif products and transportation), increased performance, and/or reduced environmental impact for product changes. To achieve these goals, Greif requests climate and sustainability data from its core suppliers through the EcoVadis platform. In 2022, Greif was able to assess 39% of its suppliers by total spend by the end of the fiscal year, exceeding our goal to assess 35% of our suppliers by the end of 2022. Greif is now using this data to help better understand its upstream Scope 3 emissions profile to drive reductions in the lifecycle emissions associated with the company's products. We annually train our buyers on EcoVadis, helping them to understand which factors guide the EcoVadis assessment. We also share EcoVadis training opportunities with our partner suppliers when relevant to help improve their sustainability initiatives.
Investment in R&D	Yes	Greif integrates the risks and opportunities identified through scenario analysis into the R&D process by strategically investing in the development of sustainable products and processes that reduce the amount virgin materials used in production to meet the growing customer demand for sustainable and lower-carbon goods. Customer preference for sustainable and lower-carbon products: Greif's product development and innovation efforts are supported by R&D investments to develop products that reduce Greif's reliance on virgin raw materials through light weighting, improving production methods, and increasing the use of recycled materials without compromising required performance standards and regulations. In 2022, Greif attributed over $1 billion of our fiscal year 2022 revenue to sustainability-tagged products, including life cycle services, for Greif's Global Industrial Packaging (GIP) business unit. Downgauging and increasing the use of post-customer resin (PCR) in its products directly reduces the raw materials required to produce products such as our JCR jerry cans, NexDrum and faceted drum from LATAM. We also developed Intermediate Bulk Containers (IBCs) made with 40% PCR that were recently UN certified and closures made from PCR. Innovative production methods that deliver material and energy efficiency: We also invest in R&D to develop new production methods, in part to support producing such products. For example, to produce the NexDrum plastic drum, Greif developed an innovative injection and welding process that works with reduced material inputs, without negatively affecting the performance and stability of the drum. This process allows us to produce the NexDrum using 15% less material and results in a 12% reduction in CO2 emissions compared to the standard blow-molded plastic drum.
Operations	Yes	Greif integrates the risks and opportunities identified through scenario analysis in operations through disaster response planning to mitigate the risk posed by changing weather patterns and acute weather events; the implementation of energy efficiency programs to reduce current and potential exposure to carbon pricing mechanisms as well as meet growing customer demand for lower carbon products; and third-party audits to increase transparency into Greif's sustainability claims for the benefit of customers. Disaster response planning: Sea level rise and changes in precipitation may lead to operational shut-downs and associated expenses, per the risk description, financial implication and strategy to mitigate described in 2.3, Greif operations include facilities in low-lying coastal areas and those at risk for tropical storms that bring high wind speeds and extreme rainfall. Our physical risk assessment conducted in 2022 concluded 27% of Greif's portfolio by asset value is exposed to medium to very high river flood risk. Greif's disaster response program mandates that all products must be able to be co-produced at multiple facilities so that we can maintain production in the event of a shut-down. Accordingly, all of Greif's operations, not just those directly at risk of these events, must be prepared to respond to them. Energy efficiency: As an asset-heavy industrial manufacturer, we have significant energy efficiency opportunities in Greif's direct operations. The Sustainability Steering Committee and Sustainability Management Team work with the Global Climate Team to develop annual project roadmaps identifying energy efficiency opportunities at each Greif facility. In 2022, Greif implemented 45 energy efficiency projects with a combined impact of 13 million kWh in annual energy savings across Greif's operations.

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Indirect costs	(Revenues) Climate related risks and opportunities influence all elements of Greif's financial planning. Greif's opportunity in changing customer behavior has factored into Greif's revenue forecast through a predicted shift in product mix from conventional to sustainable and/or low emission products (e.g., NexDrum). (Direct and indirect costs) Greif's profitability can also be impacted by raw material price volatility that may result from climate-related regulatory action or shifting customer preferences. In the event raw material prices lead to increased prices to Greif's customers, we are at risk of losing their business. (Case studies) Greif reduces exposure to this risk and addresses its customer behavior opportunity, in part, through its efforts to lightweight and downgauge its product lines. In doing so, Greif offsets potential revenue losses from conventional packaging and addressing market demand, providing revenue growth. Revenue from Greif's sustainability-tagged products and services totalled $1.0BN, 24% of total revenue from sustainable products and services in 2022. Raw material price volatility poses a direct risk to Greif's operating costs, specifically energy, water, and transportation costs. Price volatility may be compounded by the risks of sea level rise and changes in precipitation extremes, which may lead to operational shutdowns in at risk facilities. 10% of Greif's revenues ship from facilities that are at risk of sea level rise and changes in precipitation. If these facilities are impacted by these risks, Greif could lose revenues due to lost customer orders. Greif accounts for this in its financial planning process by establishing a natural disaster response protocol, across Greif's Global Industrial Products North America business unit, mandating that all Greif products can be manufactured at multiple facilities and purchase business interruption insurance coverage protecting from loss of revenue and customer business due to a loss from covered natural disasters. In the event of a shutdown, Greif's Disaster Recovery / Business Continuity program outlines the processes for fulfilling customer orders at back-up production facilities. Changes in production and shipping locations have meaningful impacts on Greif's transportation costs, both incoming for raw materials and outgoing to customer locations. Climate-related weather impacts are included in Greif's Enterprise Risk Management process and factored into the Sales and Operations Planning process (S&OP), including planning maintenance and upgrades to Greif's existing facilities.

C3.5

(C3.5) In your organization's financial accounting, do you identify spending/revenue that is aligned with your organization's climate transition?

	Identification of spending/revenue that is aligned with your organization's climate transition	Indicate the level at which you identify the alignment of your spending/revenue with a sustainable finance taxonomy
Row 1	No, but we plan to in the next two years	<Not Applicable>

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Absolute target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number

Abs 1

Is this a science-based target?

No, but we anticipate setting one in the next two years

Target ambition

<Not Applicable>

Year target was set

2021

Target coverage

Company-wide

Scope(s)

Scope 1
Scope 2

Scope 2 accounting method

Market-based

Scope 3 category(ies)

<Not Applicable>

Base year

2019

Base year Scope 1 emissions covered by target (metric tons CO2e)

676000

Base year Scope 2 emissions covered by target (metric tons CO2e)

636000

Base year Scope 3, Category 1: Purchased goods and services emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 2: Capital goods emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 4: Upstream transportation and distribution emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 6: Business travel emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 7: Employee commuting emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 10: Processing of sold products emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 11: Use of sold products emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 14: Franchises emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 15: Investments emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Other (upstream) emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Other (downstream) emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year total Scope 3 emissions covered by target (metric tons CO2e)
<Not Applicable>

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)
1312000

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1
52

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2
48

Base year Scope 3, Category 1: Purchased goods and services emissions covered by target as % of total base year emissions in Scope 3, Category 1: Purchased goods and services (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 2: Capital goods emissions covered by target as % of total base year emissions in Scope 3, Category 2: Capital goods (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target as % of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 4: Upstream transportation and distribution covered by target as % of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target as % of total base year emissions in Scope 3, Category 5: Waste generated in operations (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 6: Business travel emissions covered by target as % of total base year emissions in Scope 3, Category 6: Business travel (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 7: Employee commuting covered by target as % of total base year emissions in Scope 3, Category 7: Employee commuting (metric tons CO2e)

<Not Applicable>

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 8: Upstream leased assets (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target as % of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 10: Processing of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 10: Processing of sold products (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 11: Use of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 11: Use of sold products (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 13: Downstream leased assets (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 14: Franchises emissions covered by target as % of total base year emissions in Scope 3, Category 14: Franchises (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 15: Investments emissions covered by target as % of total base year emissions in Scope 3, Category 15: Investments (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Other (upstream) emissions covered by target as % of total base year emissions in Scope 3, Other (upstream) (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Other (downstream) emissions covered by target as % of total base year emissions in Scope 3, Other (downstream) (metric tons CO2e)
<Not Applicable>

Base year total Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)
<Not Applicable>

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes
100

Target year
2030

Targeted reduction from base year (%)
28

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

Scope 1 emissions in reporting year covered by target (metric tons CO2e)
756200

Scope 2 emissions in reporting year covered by target (metric tons CO2e)
578300

Scope 3, Category 1: Purchased goods and services emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 2: Capital goods emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 4: Upstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 5: Waste generated in operations emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 6: Business travel emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 7: Employee commuting emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 8: Upstream leased assets emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 9: Downstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 10: Processing of sold products emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 11: Use of sold products emissions in reporting year covered by target (metric tons CO2e)

<Not Applicable>

Scope 3, Category 12: End-of-life treatment of sold products emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 13: Downstream leased assets emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 14: Franchises emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 15: Investments emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Other (upstream) emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Other (downstream) emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Total Scope 3 emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)
1334500

Does this target cover any land-related emissions?
No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

% of target achieved relative to base year [auto-calculated]

Target status in reporting year
Underway

Please explain target coverage and identify any exclusions
As part of the development of Greif's 2030 goal to reduce absolute Scope 1 and Scope 2 GHG emissions 28 percent over a 2019 baseline we conducted scenario analysis and modelling to determine the feasibility and implications of aligning Greif's target to be consistent with the level of decarbonization required to keep global temperatures to well-below 2-degrees Celsius, 1.5-degrees Celsius, and business-as-usual considering existing business forecasts and energy and emissions reduction plans. We selected these scenarios in alignment with the criteria established by the Science Based Targets Initiative for setting climate targets aligned with climate science.

Plan for achieving target, and progress made to the end of the reporting year
Greif intends to achieve its GHG reduction target through efficiency enhancement programs and renewable energy procurement. Greif continuously monitors its facilities for efficiency enhancement opportunities. In 2022, Greif conducted 45 efficiency projects that reduced annual energy consumption by 13 million kWh. Greif will continue to systematically increase the energy efficiency of its facilities to meet its ambitious GHG reduction target.

List the emissions reduction initiatives which contributed most to achieving this target
<Not Applicable>

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?
Other climate-related target(s)

C4.2b

(C4.2b) Provide details of any other climate-related targets, including methane reduction targets.

Target reference number
Oth 1

Year target was set
2022

Target coverage
Company-wide

Target type: absolute or intensity
Intensity

Target type: category & Metric (target numerator if reporting an intensity target)

Energy consumption or efficiency	MWh

Target denominator (intensity targets only)
unit of production

Base year
2019

Figure or percentage in base year
0.015

Target year
2030

Figure or percentage in target year
0.01

Figure or percentage in reporting year
0.014

% of target achieved relative to base year [auto-calculated]

Target status in reporting year
New

Is this target part of an emissions target?
No, it is not part of an emissions target, however, we began investigating and pursuing renewable alternatives to replace our current electricity and natural gas consumption which will help Greif meet its absolute target outlined in C4.1a.

Is this target part of an overarching initiative?
No, it's not part of an overarching initiative

Please explain target coverage and identify any exclusions
Energy use per unit of production only includes energy use at PPS Mills, PPS CorrChoice, PPS IPG, PPS RFG, GIP EMEA, GIP APAC, GIP North America, GIP Latin America and LCS NA. This provides a more accurate year-over-year comparison in line with previous years' calculations.

Plan for achieving target, and progress made to the end of the reporting year
In 2022, Greif began investigating and pursuing renewable alternatives to replace its current electricity and natural gas consumption. Additionally, it focused on improving its investigation into virtual power purchase agreements (VPPA) and conducted an onsite solar study for North America sites. In 2023, Greif will continue to conduct energy audits and develop energy efficiency roadmaps at its mill facilities. Based on audits conducted in 2022, Greif's mill group identified 66 potential projects for 2023. As of July 2023, 22 projects have been implemented.

List the actions which contributed most to achieving this target
<Not Applicable>

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.
Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	19	127
To be implemented*	3	280
Implementation commenced*	2	29
Implemented*	45	3861
Not to be implemented	0	0

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
398

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
75000

Investment required (unit currency – as specified in C0.4)
25000

Payback period
<1 year

Estimated lifetime of the initiative
1-2 years

Comment
Projects include steam trap repairs such as annual testing to correct issues.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
79

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
14850

Investment required (unit currency – as specified in C0.4)
15000

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
LED lighting is installed as needed in the mill group in the US.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
16

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
3000

Investment required (unit currency – as specified in C0.4)
4000

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
Air leaks repaired. Testing is done annually to biannually to correct issues.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
170

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
31972

Investment required (unit currency – as specified in C0.4)
48333

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
Variable-frequency drive (VFD) installation on fan pumps.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
38

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
7258

Investment required (unit currency – as specified in C0.4)
32833

Payback period
4-10 years

Estimated lifetime of the initiative
Ongoing

Comment
Variable-frequency drive (VFD) installation on hose pump.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
5

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
998

Investment required (unit currency – as specified in C0.4)
27333

Payback period
>25 years

Estimated lifetime of the initiative
Ongoing

Comment
Variable-frequency (VFD) installation on impco disc drive.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
5

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
988

Investment required (unit currency – as specified in C0.4)
37833

Payback period
>25 years

Estimated lifetime of the initiative
Ongoing

Comment
Variable-frequency (VFD) installation on impco disc drive.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
34

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
22340

Investment required (unit currency – as specified in C0.4)
45000

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment
Significant delays in blower delivery. Blower installed 8/4/22.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
5

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
2600

Investment required (unit currency – as specified in C0.4)
10388

Payback period
4-10 years

Estimated lifetime of the initiative
6-10 years

Comment
Significant delays in fixture deliver, price increases. Install complete 8/15/22.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
310

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
35000

Investment required (unit currency – as specified in C0.4)
18000

Payback period
<1 year

Estimated lifetime of the initiative
3-5 years

Comment
UHSC Green liquor heater cleanliness. Perform cleaning of GL heater at least once a year so that a higher heat transfer can be achieved. 8.25 degrees before cleaning with 51.95 degrees after cleaning. For a difference of 43.7 degrees at a flow rate of 138 GPM.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
446

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
50093

Investment required (unit currency – as specified in C0.4)
18000

Payback period
<1 year

Estimated lifetime of the initiative
3-5 years

Comment
Heat the warm water tank with Blow heat more efficiently. With cleaning the blow heat periodically (based on bypass valve position) we will use less 60# steam. From 48,000 #/hr to 29,000 #/hr with approximately 1200 GPM of water. (Increment vs prior year is shown.)

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
370

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
41599

Investment required (unit currency – as specified in C0.4)
956612

Payback period
4-10 years

Estimated lifetime of the initiative

3-5 years

Comment
The use of the PK2320 chemical has allowed the machine to decrease the amount of steam we use per ton of paper by about 7% and an increase in production of about 4.5%. Steam reduction of 15.69 1000#/ton and 25 tons more production ($6,379,500.75/yr).

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
47

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
15000

Investment required (unit currency – as specified in C0.4)
25000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
Process optimization - VFD installation on WW pump

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
89

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
9285

Investment required (unit currency – as specified in C0.4)
18500

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
LED Lighting Phase 3: Continue to replace with LED lights.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
650

Investment required (unit currency – as specified in C0.4)
20000

Payback period
>25 years

Estimated lifetime of the initiative
11-15 years

Comment
More trap work planned for 23.

Initiative category & Initiative type

Energy efficiency in buildings	Motors and drives

Estimated annual CO2e savings (metric tonnes CO2e)
9

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
82000

Investment required (unit currency – as specified in C0.4)
1400000

Payback period
16-20 years

Estimated lifetime of the initiative
21-30 years

Comment
16k KwH savings in motors.

Initiative category & Initiative type

Non-energy industrial process emissions reductions	Process equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
126

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
22172

Investment required (unit currency – as specified in C0.4)
3917

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
High-intensity Plates: EJU 159/160
Low-intensity Plates: EJ 125/126

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
34

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
9504

Investment required (unit currency – as specified in C0.4)
190000

Payback period
16-20 years

Estimated lifetime of the initiative
11-15 years

Comment
Floating rotor on the 26" refiner.

Initiative category & Initiative type

Energy efficiency in production processes	Reuse of steam

Estimated annual CO2e savings (metric tonnes CO2e)
1014

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
125000

Investment required (unit currency – as specified in C0.4)
140000

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
Installed a thermocompressor on PM2 1st dryer section. Reuse of steam.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
56

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
32600

Investment required (unit currency – as specified in C0.4)
90000

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment
Installation of more energy efficient lights.

Initiative category & Initiative type

Energy efficiency in buildings	Other, please specify (Compressed Air)

Estimated annual CO2e savings (metric tonnes CO2e)
38

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Mandatory

Annual monetary savings (unit currency – as specified in C0.4)
8918

Investment required (unit currency – as specified in C0.4)
43700

Payback period
4-10 years

Estimated lifetime of the initiative
16-20 years

Comment
Upgrading of air compressors.

Initiative category & Initiative type

Energy efficiency in buildings	Maintenance program

Estimated annual CO2e savings (metric tonnes CO2e)
92

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Mandatory

Annual monetary savings (unit currency – as specified in C0.4)
50980

Investment required (unit currency – as specified in C0.4)
91764

Payback period
1-3 years

Estimated lifetime of the initiative
16-20 years

Comment
Electrical & Hydraulic Revamping C20

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
0

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
42

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Awareness of the operating staff to reduce energy consumption by unplugging the equipment when not in use.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
0

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
35

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Awareness of the operating staff to reduce energy consumption by unplugging the equipment when not in use.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
0

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
35

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Change in the logic of the controller to disengage the conveyor when it is not coating cylinders.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
19

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
19637

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
New compressors use systems with integrated dehumidifier.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
4

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
2154

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Programming in the printer to control hours of work / rest.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
1063

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Socialization for mill control turned on without the blower running.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
5

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
2999

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Define equipment shutdown schedule - one maintenance technician per day.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
1439

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Make staff aware of the importance of turning off equipment at the end of production.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
1200

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Define equipment shutdown schedule - one maintenance technician per day.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
8

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
3987

Investment required (unit currency – as specified in C0.4)
24786

Payback period
4-10 years

Estimated lifetime of the initiative
Ongoing

Comment
Reduction of Reactive Electrical Energy through the installation of a capacitor bank.

Initiative category & Initiative type

Energy efficiency in production processes	Compressed air

Estimated annual CO2e savings (metric tonnes CO2e)
40

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
11024

Investment required (unit currency – as specified in C0.4)
15000

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
Compressors in the phase of infrastructure installation for moving.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
441

Investment required (unit currency – as specified in C0.4)
8000

Payback period
4-10 years

Estimated lifetime of the initiative
Ongoing

Comment
Equipment in the installation phase, with which it will be possible to control the temperature and store more packages.

Initiative category & Initiative type

Energy efficiency in production processes	Electrification

Estimated annual CO2e savings (metric tonnes CO2e)
16

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
4600

Investment required (unit currency – as specified in C0.4)
28744

Payback period
4-10 years

Estimated lifetime of the initiative
11-15 years

Comment
Installation of photovoltaic cells on our plant roof.

Initiative category & Initiative type

Energy efficiency in production processes	Compressed air

Estimated annual CO2e savings (metric tonnes CO2e)
62

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
13000

Investment required (unit currency – as specified in C0.4)
58000

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment
Install energy efficient 60HP Sullair compressor.

Initiative category & Initiative type

Energy efficiency in production processes	Compressed air

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
7500

Investment required (unit currency – as specified in C0.4)
62000

Payback period
4-10 years

Estimated lifetime of the initiative
6-10 years

Comment
Install energy efficient 125HP Atlas Copco compressor.

Initiative category & Initiative type

Energy efficiency in production processes	Compressed air

Estimated annual CO2e savings (metric tonnes CO2e)
67

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
12000

Investment required (unit currency – as specified in C0.4)
31800

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment
Install energy efficient 50 HP Elgi compressor.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
242

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
36899

Investment required (unit currency – as specified in C0.4)
54000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
Install LED lighting.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
6

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
29000

Investment required (unit currency – as specified in C0.4)
41000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment
Install LED lighting.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Internal finance mechanisms	Greif integrates environmental aspects of its business into our overall business strategy, including research and development, and operations.
Internal finance mechanisms	Energy and emission reductions are factored into all capital expenditure requests.
Internal incentives/recognition programs	The Michael J. Gasser Global Sustainability Award recognizes superior effort and achievement in furthering the improvement of the environment and the company. The award recognizes teams that create innovative sustainable initiatives in Energy Excellence, Ecosystem Improvement and Sustainable Innovation. Winning teams are recognized by the CEO and the Board, in addition to receiving a trophy and celebratory lunch or dinner. Several of Greif's SBUs provide financial incentives to facilities that reduce energy consumption.
Internal incentives/recognition programs	In 2014, Greif introduced the Operations Best In Class program in the drum manufacturing plants of the EMEA region to reinforce a pattern of excellence by ranking each plant as gold, silver, bronze, yellow or red, reward workers for outstanding accomplishments and identify areas of opportunity to promote year-over-year improvements. Due to the success of the program at driving incremental improvements the program was expended globally in 2017. Ratings are based on safety, people, productivity, customer satisfaction, and sustainability, including climate change, specifically energy reduction. Each facility achieving Gold, Silver or Bronze performance levels across all categories receives a medal recognizing the achievement. In addition, Gold, Silver and Bronze winners receive a non-financial award for the entire plant such as an award dinner.
Internal incentives/recognition programs	The Greif Champions program allows Greif employees to be nominated to be a Greif Champion. The criteria for nomination are aligned with Greif's 4 strategic pillars, including the Protecting our Future pillar of Greif's Build to Last strategy. Champions are awarded $1000 to be donated to the NGO of their choice.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?
Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Plastic drums)

Description of product(s) or service(s)
NexDRUM (US): Large plastic drum, filling volume approx. 55 gallons

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 275 gallons in product

Reference product/service or baseline scenario used
Standard blowmolded TH drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.01483

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.35

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Plastic drums)

Description of product(s) or service(s)
Valerex Drums (Europe): Large plastic drum, filling volume approx. 208 liters. Valerex drums are lighter than standard drums of similar size and use fewer raw materials.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Standard blowmolded TH drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.01114

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and

also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.17

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Steel products)

Description of product(s) or service(s)
Spiraltainer: Large steel drum, filling volume approx. 208 liters. Spiraltainers are lighter than alternative drums of same size and use fewer raw materials.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Standard 1.0/1.0/1.0 TH steel drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0333

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
8.01

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Steel products)

Description of product(s) or service(s)
Large Conical Steel Drums: Large steel drum, filling volume approx. 208 liters. Conical drums are nestable drums that save space during transportation.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Standard 0.8/0.8 OH steel drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0274

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
1.2

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Intermediate bulk containers (IBCs))

Description of product(s) or service(s)
Bundled IBC (New or Recon): Offer of new and re-conditioned composite IBCs in a bundle (some IBCs get re-collected and washed or re-bottled; re-usage)

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Delivery of new IBCs only

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0268

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Assumption: Bundle IBC consits of 50% new and 50% re-conditioned IBCs (half washed / half re-bottled).

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.31

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Intermediate bulk containers (IBCs))

Description of product(s) or service(s)
Injected IBC pallet: Plastic pallet for composite IBCs

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
1 pallet for a 1.000 liters IBC

Reference product/service or baseline scenario used
Plastic pallets for composite IBCs with an old standard design

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0013

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.19

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (PCR products)

Description of product(s) or service(s)
Small Blowmoulded Jerry Cans: Jerry cans which are made from a mixture of virgin HDPE and post consumer resin (PCR).

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Jerry cans made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.045

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 20 liters design, 75% PCR share

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.002

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (PCR products)

Description of product(s) or service(s)
Small Blowmoulded Drums (Mono): Small plastic drums which are made from a mixture of virgin HDPE and post consumer resin (PCR)

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Drums made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0307

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 120 liters design, 75% PCR share

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (PCR products)

Description of product(s) or service(s)
Int. Plastic Blowmoulded Drums: Large plastic drums which are made from a mixture of virgin HDPE and post consumer resin (PCR)

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Drums made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0368

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 208 liters design, 75% PCR share.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.1

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (PCR products)

Description of product(s) or service(s)
PCR IBCs: Composite IBCs with bottles which are made from a mixture of virgin HDPE and post consumer resin (PCR)

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
IBCs made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0069

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 14,5 kg bottle type, 40% PCR share.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.03

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Jerry cans)

Description of product(s) or service(s)
JCR jerry cans mono & coex LATAM (1-50 liters): Jerry cans made of PE. JCR jerry cans are 10-15% lighter than alternative, standard jerry cans and made with fewer raw materials.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Jerry cans in standard design

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0135

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and

also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 20 liters design.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.03

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Jerry cans)

Description of product(s) or service(s)
JCR jerry cans rest of the world (1-30 liters): Jerry cans made of PE. JCR jerry cans are 10-15% lighter than alternative, standard jerry cans and made with fewer raw materials.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Jerry cans in standard design

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0135

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 20 liters design.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.13

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Reconditioned Steel Drums)

Description of product(s) or service(s)
Furnaced large steel drums, filling volume approx. 55g

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Standard 1.0/1.0/1.0 TH steel drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.05014

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Downgauged drums (0.8/0.8/0.8 and below) for non-Spiraltainer LSD)

Description of product(s) or service(s)
Large steel drum, filling volume approx. 208 liters. These drums are lighter and made with fewer raw materials.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Standard 1.0/1.0/1.0 TH steel drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0222

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
1.6

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Knock Down Drums)

Description of product(s) or service(s)
Foldable steel drums, filling volume approx. 55g. Greif's Knock Down Drums (KDD) offer the optimal sustainable solution for transporting steel drums to remote locations. Semi-finished drum parts are shipped and assembled locally on-site with minimum people and equipment. The unique concept allows transportation of up to 1,176 KDDs in a 20' sea container compared to 80 full finished drums, saving valuable space, optimizing transport costs and minimizing our customers' carbon footprint during longer transit times.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Delivery of drums suitable for a transport of 1.000 liters in product (1.000 km)

Reference product/service or baseline scenario used
Standard 0.8/0.8 OH steel drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0373

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.17

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (OH LPD faceted, manufactured in Tigre)

Description of product(s) or service(s)
Large faceted OH plastic drum, filling volume is approximately 206 liters. This plastic drum innovation using a never seen before faceted side-wall approach for large plastic drums. This improvement removes up to 14 percent of the resin in the drum while maintaining performance. The design reduces raw material usage and optimizes pallet utilization due to its unique configuration, allowing more drums to be transported in the same space as the legacy design.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product (1.000 km)

Reference product/service or baseline scenario used
Large circular design plastic drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0138

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated

climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Plastic feet on pallets made of PCR (about 1.36 kg))

Description of product(s) or service(s)
Feet made of post consumer resin (PCR) plastics, integral part of hybrid pallets for IBCs

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Feet made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0002

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.05

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (IBC corner protector made of PCR (about 1,26 kg))

Description of product(s) or service(s)
Corner protectors made of post consumer resin (PCR) plastics, accessory for UN-IBCs to protect the bottle

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Corner protectors made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0001

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.05

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Plasticap-60 NIR)

Description of product(s) or service(s)
Plastic cap for jerry cans made of HDPE, manufactured with NIR detectable black colorants that recycling machines can easily detect to remove them from waste streams and recycle them.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
1 ton of finished products

Reference product/service or baseline scenario used
Caps made of HDPE, but manufactured with carbon black pigments with are not detectable by machines and therefore don't get recycled.

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
1.1998

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.001

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?
No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?
Yes, a divestment

Name of organization(s) acquired, divested from, or merged with
Flexible Packaging

Details of structural change(s), including completion dates
In April 2022, Greif finalized its 50 percent divestment of the Flexible Packaging joint venture to Gulf Refined Packaging. This completed divestment concludes the consolidation and standardization of our GIP businesses with a single leadership team.

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	Yes, a change in methodology	In early 2023, Greif completed an assessment of its Scope 3 emissions. The FY22 inventory provides more complete coverage of our operations and, for the first time, includes the following: diesel & LPG consumption for global facilities, global propane usage, co-generation at the Los Angeles facility, global rental car usage, electricity consumption at warehouse and office facilities. This has led to a large increase in total energy consumption and associated emissions.

C5.1c

(C5.1c) Have your organization's base year emissions and past years' emissions been recalculated as a result of any changes or errors reported in C5.1a and/or C5.1b?

	Base year recalculation	Scope(s) recalculated	Base year emissions recalculation policy, including significance threshold	Past years' recalculation
Row 1	No, because the impact does not meet our significance threshold	<Not Applicable>	Greif aligns with GHG Protocol's recalculation policy and therefore determined that changes in emission factors and/or activities do not trigger a recalculation of emissions for Scope 3. We are working to improve our data collection and calculation processes and will continue to evaluate a threshold and recalculations in the coming years.	No

C5.2

(C5.2) Provide your base year and base year emissions.

Scope 1

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
676000

Comment

Scope 2 (location-based)

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
614000

Comment

Scope 2 (market-based)

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
636000

Comment

Scope 3 category 1: Purchased goods and services

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
2578000

Comment

Scope 3 category 2: Capital goods

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
101000

Comment

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
292000

Comment

Scope 3 category 4: Upstream transportation and distribution

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
185000

Comment

Scope 3 category 5: Waste generated in operations

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
84000

Comment

Scope 3 category 6: Business travel

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
10000

Comment

Scope 3 category 7: Employee commuting

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
29000

Comment

Scope 3 category 8: Upstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 9: Downstream transportation and distribution

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 10: Processing of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 11: Use of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 12: End of life treatment of sold products

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
1124000

Comment

Scope 3 category 13: Downstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 14: Franchises

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 15: Investments

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3: Other (upstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3: Other (downstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

IPCC Guidelines for National Greenhouse Gas Inventories, 2006
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
The Greenhouse Gas Protocol: Scope 2 Guidance
US EPA Mandatory Greenhouse Gas Reporting Rule
Other, please specify (National Council for Air and Stream Improvement, Inc. (NCASI))

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)
756200

Start date
<Not Applicable>

End date
<Not Applicable>

Comment

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based
We are reporting a Scope 2, location-based figure

Scope 2, market-based
We are reporting a Scope 2, market-based figure

Comment

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

Scope 2, location-based
565300

Scope 2, market-based (if applicable)
578300

Start date
<Not Applicable>

End date
<Not Applicable>

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1, Scope 2 or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure?

Yes

C6.4a

(C6.4a) Provide details of the sources of Scope 1, Scope 2, or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure.

Source of excluded emissions
Air conditioning refrigerant replacement

Scope(s) or Scope 3 category(ies)
Scope 1

Relevance of Scope 1 emissions from this source
Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source
<Not Applicable>

Relevance of market-based Scope 2 emissions from this source
<Not Applicable>

Relevance of Scope 3 emissions from this source
<Not Applicable>

Date of completion of acquisition or merger
<Not Applicable>

Estimated percentage of total Scope 1+2 emissions this excluded source represents
0.1

Estimated percentage of total Scope 3 emissions this excluded source represents
<Not Applicable>

Explain why this source is excluded
Given the variety of regulations, the quantity of refrigerants has been challenging to collect.

Explain how you estimated the percentage of emissions this excluded source represents
Refrigerant data was estimated based on square footage using the United States Environmental Protection Agencies' HFC Emissions Accounting Tool. It was assumed that certain facility types including land, other, parking, storage, and warehouse spaces were not air conditioned.

Source of excluded emissions
Process emissions

Scope(s) or Scope 3 category(ies)
Scope 1

Relevance of Scope 1 emissions from this source
Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source
<Not Applicable>

Relevance of market-based Scope 2 emissions from this source
<Not Applicable>

Relevance of Scope 3 emissions from this source
<Not Applicable>

Date of completion of acquisition or merger
<Not Applicable>

Estimated percentage of total Scope 1+2 emissions this excluded source represents
0.2

Estimated percentage of total Scope 3 emissions this excluded source represents
<Not Applicable>

Explain why this source is excluded
Manufacturing generally involves painting exterior and coating interior surfaces. Process emissions from this paining have not been included in the inventory as the emissions have been difficult to calculate.

Explain how you estimated the percentage of emissions this excluded source represents
Process emissions are characterized as VOC emissions from paints, coatings, solvents, inks, resins, etc. The average VOC content for paints, coatings, solvents, and inks used by Greif were applied to data collected from 11 facilities. The VOC content for resins was calculated using an assumed 0.067 lb VOC/lb resin. An average GWP of between 0.1 and 12 was applied to the calculated VOC emissions to get the CO2 equivalent emissions. The calculated emissions were used to derive an emission factor based on square footage which was applied to Greif's remaining facilities to estimate the total excluded emissions.

Using this approach, VOCs could represent between 0.2% to 27.5% of Scope 1 and 2 emissions and warrants further review in the future to ensure that this is not a material source.

Source of excluded emissions
Sludge

Scope(s) or Scope 3 category(ies)
Scope 3: Waste generated in operations

Relevance of Scope 1 emissions from this source
<Not Applicable>

Relevance of location-based Scope 2 emissions from this source
<Not Applicable>

Relevance of market-based Scope 2 emissions from this source
<Not Applicable>

Relevance of Scope 3 emissions from this source
Emissions are not relevant

Date of completion of acquisition or merger
<Not Applicable>

Estimated percentage of total Scope 1+2 emissions this excluded source represents
<Not Applicable>

Estimated percentage of total Scope 3 emissions this excluded source represents
3.3

Explain why this source is excluded
Greif's Riverville facility has an operational landfill and reports their emissions to the United States Environmental Protection Agency annually. All other facilities are below the reporting threshold for inclusion.

Explain how you estimated the percentage of emissions this excluded source represents

C6.5

(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
3329900

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from purchased goods and services by tracking the total weight of the primary materials we purchase each year (steel, corrugated cardboard, plastic resins, etc.) and multiplying by corresponding emission factors, which are sourced from relevant trade associations.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, Calculation formula [1.5] Spend-based method, p 33

Capital goods

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
144800

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from capital goods by determining capital goods spend and multiplying it by the appropriate emission factor.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, average spend method, p 37

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
312500

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif tracks the fuel use and purchased energy used in our operations annually as part of our Scope 1 and 2 GHG inventory. Based on this consumption, Greif multiples Scope 1 and 2 emissions by the relevant emission factor in % of Scope 1 and 2 emissions to determine upstream emissions associated with this consumption.
Baseline methodology reference: GHG Protocol Scope 3 Evaluator Background Document, p6, Scope 3, Category 3: Fuel- and energy-related activities.

Upstream transportation and distribution

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
424700

Emissions calculation methodology
Fuel-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif monitors the fuel used for transporting goods upstream of our operations and for the transport of our products that we pay for in dollars spend/year. Greif then converts this data to gallons/year and applies fuel-based emission factors to determine overall emissions.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, Calculation formula [4.6] Distance-based method, p 61

Waste generated in operations

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
158500

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from our operational waste by tracking the total amount of waste broken down by hazardous versus non-hazardous and by each disposal method (landfill, reuse, reclamation, incineration, etc.) and multiplying by average emission factors to determine total emissions associated with this waste.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, Calculation formula [5.2] Waste-type-specific method, p 75

Business travel

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
1800

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif tracks the type and amount of business travel in the reporting year for our employees (air, rail, auto, etc.) and utilizes average emission factors to determine overall emissions.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, spend-based method, p 86

Employee commuting

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
15400

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from employee commuting based on average data on commuting patterns and relevant emission factors.
Baseline methodology reference: GHG Protocol Documentation of the data and calculations to support the Greenhouse Gas Protocol Scope 3 Screening Tool, March 2017, Scope 3, Category 7: Employee Commuting, p8

Upstream leased assets

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not lease any upstream assets that are not already included in scope 1 and 2 emissions calculations based on our organizational boundary for calculating GHG emissions. Therefore, Scope 3 emissions from upstream leased assets are not relevant and emissions from this category are zero (0).

Downstream transportation and distribution

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
It is Greif's practice to deliver finished products to customers using transportation paid for by Greif. Therefore, downstream transportation and distribution emissions are not relevant to Greif and emissions associated with this category are zero (0). All transportation and distribution emissions are accounted for in category 4

Processing of sold products

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif's products are finished packaging products and do not require further processing. Therefore, the processing of sold products is not relevant to Greif and GHG emissions from this source are zero (0).

Use of sold products

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif's sold product do not use or consume energy during the use phase, nor do they result in other sources of emissions while being used. Therefore, emissions from the use of sold products are not relevant to Greif and emissions associated with this category are zero (0).

End of life treatment of sold products

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
631800

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from the end-of-life treatment of sold products by tracking the total weight of the primary materials we purchase each year (steel, corrugated cardboard, plastic resins, etc.), assuming that all materials that are purchased in the reporting period are also sold in the same reporting period and multiplying by corresponding end-of-life treatment emission factors for each material type. Emission factors are sourced from the EPA WARM model.
Baseline methodology references: US EPA WARM Model Verison 13, 2015.
Assuming 100% landfilling. Factor taken from Report Exhibit 17, p.22, ""Mixed Metals"" and ""Mixed Plastics""
US EPA WARM Model Verison 13, 2015. Assuming 100% lan taken from Report Exhibit 17, p.21, ""Corrugated Containers

Downstream leased assets

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not lease any assets to third parties and therefore this category is not relevant, and emissions associated with downstream leased assets are zero (0). Greif includes all our directly managed assets in scope 1 and 2 emissions calculations.

Franchises

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not have any franchises; therefore, this category is not relevant and GHG emissions from franchises are zero (0).

Investments

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
As a manufacturing company, Greif only has minor investments and does not make any investments with the objective of making a profit. Therefore, GHG emissions from this category are expected to not be relevant and be nearly zero (0).

Other (upstream)

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not have other (upstream) emissions which have not been accounted for in this inventory.

Other (downstream)

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not have other (downstream) emissions which have not been accounted for in this inventory.

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?
Yes

C6.7a

(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	280612	This includes CO2 emissions from biomass combustion from our Riverville facility.

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure
0.00021

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
1334500

Metric denominator
unit total revenue

Metric denominator: Unit total
6349500000

Scope 2 figure used
Market-based

% change from previous year
7

Direction of change
Decreased

Reason(s) for change
Change in renewable energy consumption
Other emissions reduction activities
Change in revenue

Please explain
In 2022, the main driver for Greif's improved emissions intensity metric is attributable to total revenue increasing significantly (14%) YOY. Additionally, Greif increased OCC waste and biomass energy consumption across facilities and implemented several emissions reduction activities throughout its operations.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?
Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	754400	IPCC Fifth Assessment Report (AR5 – 100 year)
CH4	850	IPCC Fifth Assessment Report (AR5 – 100 year)
N2O	970	IPCC Fifth Assessment Report (AR5 – 100 year)

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/area/region.

Country/area/region	Scope 1 emissions (metric tons CO2e)
United States of America	700197
China	7236
Netherlands	5442
Belgium	3499
France	3342
Singapore	1772
Russian Federation	4990
United Kingdom of Great Britain and Northern Ireland	2304
Brazil	2335
Canada	982
Spain	1655
Germany	2111
Sweden	1147
Czechia	1087
South Africa	1021
Turkey	905
Mexico	880
Argentina	959
Saudi Arabia	1184
Malaysia	1865
Hungary	1457
Israel	582
Colombia	290
Greece	256
Poland	1742
Viet Nam	285
Chile	1641
Costa Rica	361
Portugal	2384
Egypt	178
Kenya	166
Romania	92
Algeria	107
Guatemala	29
Morocco	88
Austria	328
Denmark	23
Italy	1367

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division
By facility

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Paper Packaging and Services (PPS)	609348
Industrial Packaging and Services (IPS)	106467
Life Cycle Services (LCS)	8845
Corporate	246
Global Packaging Accessories (GPA)	1923
Flexible Products and Services (FPS)	402
Mobile Fleet	28759

C7.3b

(C7.3b) Break down your total gross global Scope 1 emissions by business facility.

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Riverville	169207	37.361933	-78.816822
Massillon	75989	40.751595	-81.516981
Austell	54065	33.817478	-84.645034
Sweetwater	43333	33.815504	-84.638781
Milwaukee	42284	43.061334	-87.886828
Fitchburg	30173	42.583689	-71.816767
Cincinnati (CCI)	28005	39.28495	-84.353126
Baltimore	23282	39.847557	-82.603428
Commerce	24944	33.982284	-118.162551
Taylors	22054	34.925427	-82.278466
Tama	20495	41.961022	-92.580327
Tacoma	13851	47.239218	-122.423163
Mason (MPM)	6645	42.56309	-84.431487
Houston	20896	29.702184	-95.060463
Harrisburg (SPC)	8691	35.333724	-80.60945
Alsip	7274	41.65628	-87.72619
Delaware	238	40.227436	-83.048427
Louisville (MCC)	15567	38.167553	-85.892689
Arkadelphia	4313	34.518036	-93.120531
Warminster	3470	40.202395	-75.08425
Pioneer	1768	1.305161	103.661178
Ghent	2975	51.098069	3.709088
Europoort	1999	51.905708	4.218638
Taicang	2087	31.511078	121.29397
Santa Clara	10622	37.363492	-121.942317
Palmyra	5357	40.289563	-76.599223
Rouen	1959	49.429373	1.034016
Merced	2126	37.315464	-120.51356
Oshkosh	683	43.99125	-88.602256
Oak Creek	2090	42.888193	-87.862387
Van Wert	2984	40.861239	-84.589764
Caojing	1717	30.814496	121.447488
Huizhou	1344	23.127033	114.56039
Ellesmere Port	1269	53.282018	-2.883468
Martorell	1421	41.485275	1.923039
Melzo	993	45.498336	9.411187
Tianjin	1075	39.064877	117.692212
Moraine	57	39.716747	-84.226226
Welcome	122	35.92927	-80.238343
Santo Amaro	1331	-23.666907	-46.706618
Usti nad Labem	1067	50.663338	14.002691
Vreeland	968	52.232263	5.033013
Falkenburg	1054	56.900564	12.47144
Laudun	865	44.087714	4.65225
Kernersville	633	36.095375	-80.060383
Auburndale	841	28.049694	-81.78337
Tigre	847	-34.442832	-58.59765
Burton on Trent	818	52.815766	-1.640464
Loevenich	600	50.945177	6.841812
Asterweg	725	52.390789	4.903499
Petaling Jaya	1865	3.090845	101.639208
Cuernavaca	765	18.914236	-99.181661
Perm	737	57.959764	56.264045

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Zhuhai	611	21.998573	113.193285
York	1053	40.000638	-76.733953
Winfield	801	37.619931	-96.224676
Almasfuzito	554	47.72311	18.26891
Hamburg	841	53.522726	9.986966
Florence	1453	38.979366	-84.631086
Ein Hahoresh	517	32.385852	34.939996
Mobeni	603	-29.937243	30.95667
Omsk	601	54.995717	73.200768
Fontana	627	34.103782	-117.460408
Atlanta	281	33.106791	0
San Jose	367	9.872187	-84.070261
Jubail	483	27.043394	49.503123
Bay Minette	102	30.861078	-87.76787
Lille	402	50.528468	2.854623
Vologda	419	59.230386	39.861042
Vanderbijlpark	418	-26.656996	27.849403
Texarkana	45	33.42513	-94.04769
Baytown	616	29.811585	-94.845551
Doraville	0	33.913456	-84.270017
De Pere	190	44.423429	-88.095456
Rock Hill	138	34.960113	-81.021918
Lier	488	51.140352	4.556225
Volgograd	461	48.576516	44.446268
Aratu	325	-12.82368	-38.43188
St. Francis	2441	42.97294	-87.879646
Mandra	256	38.079017	23.521605
Meridian	39	31.500439	-91.418239
Rybnik	1724	50.101336	18.566753
Vung Tau	285	10.637948	107.032545
Riyadh	299	24.524424	46.906984
Pudahuel	1631	-33.379795	-70.772138
Charlotte	156	35.266669	-80.898581
Samandira	167	40.972582	29.220839
Naperville	273	41.781485	-88.2284
Lithonia	323	33.730249	-84.117424
Windsor Locks	265	41.938497	-72.663775
Esteio	216	-29.842211	-51.182939
Neenah	279	44.195056	-88.485267
Angarsk	211	52.5913	103.91195
Buffalo	119	42.869401	-78.752039
West Monroe	49	32.497408	-92.169552
Castenedolo	295	45.476687	10.282674
Winnipeg	308	49.886062	-96.958942
Bradley	242	41.147937	-87.858781
Don Benito	211	38.975221	-5.86988
Povoa	2355	38.862524	-9.06204
Woodbine	15	31.228448	-81.529902
Beloyarsk (Upakovka)	269	56.780625	61.35926
Lavonia	258	34.42708	-83.104552
Minerva	1073	40.724537	-81.113751
Englishtown	146	40.344805	-74.267487
Bogota	260	4.735675	-74.134815
St. Gabriel (Evans)	475	30.248753	-91.077168
Kaluga	1097	55.215766	36.67255
Ede	1476	52.035227	5.605774
Ontario	7	34.062472	-117.602184
Chicago	353	41.85861	-87.737341
Okemah	0	35.42794	-96.276894
Salt Lake City	132	40.716209	-111.955575
Lockport	157	41.586177	-88.062498
Arlington	144	32.68425	-97.080769
Sultanbeyli	90	40.974861	29.262411
Mombasa	166	-4.044386	39.649271
Scarborough	184	43.770557	-79.277391
Sadat City	174	30.363449	30.543326
Palatka	21	29.680563	-81.655638
Rio de Janeiro	170	-22.85935	-43.248031
Wright City	193	38.829	-91.027184
Saginaw	1062	43.453409	-83.882253
Bottanuco	79	45.641089	9.512149

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Algeria	107	35.753193	-0.564082
Salem	40	42.510018	-70.901076
Mendig	240	50.370317	7.300518
Nashville	21	35.835267	-87.447124
Dalton	463	34.713814	-84.962339
Monterrey	115	25.718797	-100.309129
Vaesterhaninge	86	59.115471	18.079067
Mobile	27	30.697822	-88.207648
Botosani	90	47.761479	26.620401
Belleville	161	44.196304	-77.373985
Crossett	1	33.130895	-91.97867
Denver	120	39.763963	-104.829123
Casablanca	88	33.605857	-7.531868
Toledo	209	41.661368	-83.451283
Silsbee	19	30.350659	-94.135686
Morgan Hill	117	37.123345	-121.643528
Longview	102	46.124121	-122.936644
Rheine	51	52.220769	7.488654
Franklin	138	36.761031	-86.569069
Mississauga	96	43.63916	-79.677305
Shanghai	34	30.821792	121.459715
Kingston	74	44.269498	-76.513113
Chicopee	103	42.205625	-72.553604
Phoenix	96	33.445944	-111.97121
Tallahassee	2	30.405751	-84.306413
Mt. Sterling	92	38.061192	-83.950564
Corinth	377	34.918752	-88.523501
Cedartown	104	34.01865	-85.229551
Columbus	66	40.009346	-83.134696
Beardstown	79	39.99749	-90.408876
Guatemala	29	14.460795	-90.640788
Kazan	29	55.848086	49.118889
Newark	3	40.738785	-74.133474
Grand Rapids	156	42.915588	-85.546882
Hadimkoy	4	41.15461	28.614758
Delta	5	49.129754	-123.022984
Hazleton	1284	40.973266	-76.019165
Carol Stream	4324	41.91665	-88.1122
Lynchburg Warehouse	2851	37.37699	-79.1674
Chino Warehouse	1995	33.97064	-117.615
Caraustar HQ	1082	33.82846	-84.49673
Concord Warehouse	930	35.33394	-80.6113
Hungary Service Center	817	47.72991	18.256632
Midland Warehouse	783	43.59963	-84.1994
Box Board	732	36.0928	-79.9832
Vincennes Warehouse	723	38.65296	-87.5164
Gebze	644	40.85912	29.4272
Ryazan	629	54.6269	39.6916
Torzhok Warehouse	525	57.035934	34.969076
Zhenjiang	348	29.93093	121.7105
Riyahd	299	24.52442	46.90698
Carotell	184	34.91904	-82.2756
La Salle Warehouse	154	45.43647	-73.6378
Hardeeville	119	32.28724	-81.0845
Waynesville	92	35.47918	-82.8895
Araucaria	82	-25.558	-49.3809
Augusta	59	33.45454	-81.9396
Londrina	59	-23.3591	-51.1507
Battleground Warehouse	47	29.70188	-95.095
Chattanooga	19	35.02937	-85.2977
Manaus	15	-3.09993	-59.9108
Riviera Beach 11	11	26.77861	-80.0755
Belgium Coordination Center	8	51.349653	4.637723
Weyers Cave	6	38.27693	-78.9258
Stockton	2	37.94751	-121.29

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/area/region.

Country/area/region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
United States of America	480966	480923
China	16340	15795
Turkey	7365	6909
Italy	8806	14908
Netherlands	5812	7999
Israel	4378	3799
Germany	4500	6661
Russian Federation	3906	3906
Romania	1374	1403
Belgium	1249	1429
Argentina	3403	3403
Singapore	2824	2824
Ukraine	620	620
Poland	2639	3487
Brazil	3966	3966
South Africa	3157	3157
Mexico	1169	1169
Morocco	2125	2125
Malaysia	1497	1497
United Kingdom of Great Britain and Northern Ireland	1534	2440
Saudi Arabia	2157	2157
Spain	727	1429
Portugal	442	831
Canada	129	129
France	763	681
Greece	275	375
Czechia	620	779
Viet Nam	865	865
Chile	473	199
Hungary	281	398
Egypt	299	299
Colombia	194	194
Sweden	184	968
Austria	125	0
Algeria	328	328
Kenya	16	16
Denmark	90	505
Guatemala	26	26
Costa Rica	1	1

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division
By facility

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Paper Packaging and Services (PPS)	443142	443536
Industrial Packaging and Services (IPS)	101639	113632
Flexible Products and Services (FPS)	10428	10058
Global Packaging Accessories (GPA)	6542	7506
Life Cycle Services (LCS)	2520	2520
Corporate	1353	1348

C7.6b

(C7.6b) Break down your total gross global Scope 2 emissions by business facility.

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Riverville	158719	158719
Austell	31994	31994
Sweetwater	27310	27310
Milwaukee	27660	27660
Massillon	34796	34796
Santa Clara	19657	19657
Baltimore	20238	20238
Cincinnati (CCI)	19570	19570
Tama	12951	12951
Fitchburg	13510	13510
Taylors	9128	9128
Houston	9514	9514
Hadimkoy	3243	2788
Alsip	7161	7161
Samandira	2689	2689
Tacoma	5888	5888
Lockport	5428	5428
Florence	1289	1289
St. Francis	923	923
Ein Hahoresh	4378	3799
Commerce	6719	6719
Castenedolo	4089	6922
Bottanuco	4055	6864
Lavonia	3990	3990
Caojing	4461	3915
Changzhou	1581	1581
Mason (MPM)	4330	4330
Negresti	1319	1347
Bradley	3579	3579
Taicang	2598	2598
Pioneer	2824	2824
Louisville (MCC)	3845	3845
Rybnik	2639	3487
Mendig	2953	4372
Zhitomir	620	620
Ede	2354	3036
Europoort	1586	2277
Zhenjiang	3495	3495
Mt. Sterling	3134	3134
Asterweg	1604	2301
Harrisburg (SPC)	2518	2518
Hazleton	2242	2242
Casablanca	2125	2125
Petaling Jaya	1497	1497
Delaware	1360	1355
Tigre	1565	1565
Van Wert	1776	1776
Huizhou	1572	1572
Arkadelphia	1150	1150
Warminster	1302	1302
Vanderbijlpark	1278	1278
Campana	1313	1313
Maehuala	470	470
Kazan	938	938
Lithonia	1010	1010
Zhuhai	1138	1138
Santo Amaro	1561	1561
Mobeni	1879	1879
Ellesmere Port	1164	1853
Kaluga	1097	1097
Tianjin	1064	1064
Melzo	662	1121
Povoa	442	831
Oshkosh	809	809
Sultanbeyli	768	768
Jubail	1530	1530
Palmyra	1562	1562
Wright City	684	684
Naperville	890	890
Mandra	275	375
Usti nad Labem	620	779

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Muhlhoff	583	863
Cuernavaca	618	618
Baytown	2237	2237
Rouen	593	529
Riyadh	627	627
Merced	1403	1394
Welcome	468	468
Londrina	1016	1016
Auburndale	577	577
Hamburg	484	717
Araucaria	737	737
Martorell	296	582
San Juan	525	525
Loevenich	448	664
Perm	536	536
Belleville	89	89
Beardstown	450	450
San Roque (Cadiz)	354	696
Charlotte	416	416
Oak Creek	447	447
Pudahuel	473	199
Melzo	662	1121
Chicago	530	530
Atlanta	614	614
Shanghai	431	431
Winfield	410	410
Omsk	382	382
Almasfuzito	273	386
Vologda	365	365
Vung Tau	676	676
Arlington	329	329
Sadat City	299	299
Burton on Trent	324	516
Rock Hill	347	347
Texarkana	385	385
Vreeland	233	335
Volgograd	257	257
Dalton	313	313
Minerva	407	407
Manaus	406	406
Toledo	252	252
York	289	289
Franklin	281	281
St. Gabriel (Evans)	259	259
Phoenix	276	276
Saginaw	289	289
Beloyarsk (Upakovka)	237	237
Fontana	259	246
Okemah	214	214
Ho Chi Minh City	188	188
Mobile	939	939
Windsor Locks	216	216
Doraville	235	235
Grand Rapids	202	202
Bay Minette	217	217
Bogota	182	182
Morgan Hill	202	202
Botosani	55	56
Moraine	192	192
Woodbine	193	193
Falkenburg	179	939
Silsbee	179	179
Meridian	157	157
Vienna	125	0
Englishtown	176	176
Corinth	191	191
Neenah	143	143
Don Benito	77	151
Monterrey	79	79

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Palatka	118	118
Chicopee	116	116
Cedartown	208	208
De Pere	103	103
Riviera Beach	119	119
Denver	122	122
Chattanooga	110	110
Algeria	328	328
Longview	111	111
Kingston	17	17
Newark	13	13
Ontario	35	35
Laudun	88	78
Thirsk	45	71
Nashville	139	139
Columbus	97	97
Weyers Cave	83	83
Angarsk	68	68
Rheine	31	46
Izegem	0	0
Augusta	78	78
Rio de Janeiro	105	105
Lille	79	70
Stockton	74	74
Crossett	1	1
West Monroe	78	78
Scarborough	15	15
Aratu	90	90
Cleveland	51	51
Salt Lake City	80	80
Salem	61	61
Mombasa	16	16
Waynesville	47	47
Buffalo	50	50
Shreveport	36	36
Mississauga	7	7
Hedehusne (Roskilde)	90	505
Winnipeg	0	0
Esteio	50	50
Tallahassee	31	31
Guatemala	26	26
San Jose	21	21
Johnsonville	28	28
Vaesterhaninge	6	29
Montceau	4	4
Delta	0	0
Cartagena	12	12
Kernersville	528	528
Ghent	513	587
Carol Stream	3111	3096
Box Board	1670	1670
Lier	734	734
Gebze	665	665
Lynchburg	179	179
Hardeeville	171	171
Caraustar	121	121
Chino Warehouse	63	63
Battleground Warehouse	61	61
Midland Warehouse	57	57
Vincennes Warehouse	45	45
Concord Warehouse	36	36
Amstelveen	35	50
Torzhok Warehouse	25	25
Oak Vale, MS - Soterra	9	9
Hungary Service Center	8	12
Grove Mill	7	7
Pine Grove	6	6
Copley	4	4
Frank Headley Drive, MS - Soterra	3	3
Guadalajara	3	3
Vicksburg	3	3

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Belgium Coordination Center	2	2
Jackson (Flowood)	2	2
Pelahatchie	2	2

C7.7

(C7.7) Is your organization able to break down your emissions data for any of the subsidiaries included in your CDP response?

No

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Increased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change in emissions	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	3113	Increased	0.25	While Greif's renewable electricity consumption fell from FY21 to FY22, biomass energy consumption at the Riverville facility increased by approximately 259,911 MWh. Biomass represents 99.5% of Greif's renewable energy consumption. However, because increased biomass consumption at Riverville did not displace natural gas consumption, which remained consistenent YOY, the result was an increase in emissions of 3,113 tonnes CO2e attributable to CH4 and N2O from biomass combustion. This increase accounts for approximately .25% of FY21 Scope 1 and 2 emissions. (3,113/1,261,900)*100 = .25%.
Other emissions reduction activities	3861	Decreased	0.31	In FY22 Greif's emission reduction projects reduced total Scope 1 and Scope 2 emissions by approximately 3,861 tonnes CO2e. This reduction is less than 1% of FY21 Scope 1 and Scope 2 emissions. (3,861/1,261,900)*100= 0.31%.
Divestment	0	No change	0	FPS closed in April 2022. However, the associated emission reduction is accounted for in the "change in output" field.
Acquisitions	0	No change	0	There were no acquisitions in FY22.
Mergers	0	No change	0	There were no mergers in FY22.
Change in output	17741	Increased	1.41	Greif's PPS, GIP, FPS, and LCS production divisions contribute to the majority of the company's greenhouse gas emissions. Greif's FPS branch ceased operations in April 2022. However, emissions at these facilities increased by approximately 17,741 metric tonnes CO2e or 0.57% of FY21 Scope 1 and 2 emissions. (17,741/1,262,000)*100=1.41%.
Change in methodology	65937	Increased	5.22	For the first time in FY22, Greif calculated emissions associated with Diesel and LPG consumption at global facilities, gobal propane usage, co-generation at their Los Angeles facility, and global car rentals. Compared to the FY21 inventory, these operations contributed an additional 65,937 metric tons CO2e, or 5.22% of FY21 Scope 1 and 2 emissions. (65,937/1,261,900)*100 = 5.22%.
Change in boundary	0	No change	0	There was no change in the emissions inventory boundary during FY22
Change in physical operating conditions	0	No change	0	There were no known changes in physical operating conditions during FY22 that would impact company emissions.
Unidentified	10330	Decreased	0.82	There were unidentified decreases in emissions that are unable to be attributed to a specific category. These unidentified drivers reduced emissions by 10,330 metric tons CO2e, or 0.82% of FY21 Scope 1 and 2 emissions. (10,330/1,261,900)*100 = 0.82%.
Other	0	No change	0	

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Market-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 0% but less than or equal to 5%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	900603	3831128	4731731
Consumption of purchased or acquired electricity	<Not Applicable>	0	1363397	1363397
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	51027	51027
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	4816	<Not Applicable>	4816
Total energy consumption	<Not Applicable>	905419	5245552	6150971

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	Yes

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Sustainable biomass

Heating value
HHV

Total fuel MWh consumed by the organization
877227

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
877227

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Other biomass

Heating value
HHV

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Other renewable fuels (e.g. renewable hydrogen)

Heating value
HHV

Total fuel MWh consumed by the organization
23375

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
23375

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Coal

Heating value
HHV

Total fuel MWh consumed by the organization
6491

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
6491

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Oil

Heating value
HHV

Total fuel MWh consumed by the organization
110623

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
110623

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Gas

Heating value
HHV

Total fuel MWh consumed by the organization
3714374

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
923271

MWh fuel consumed for self-generation of steam
2634038

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
157065

Comment

Other non-renewable fuels (e.g. non-renewable hydrogen)

Heating value
Please select

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Total fuel

Heating value
HHV

Total fuel MWh consumed by the organization
4731731

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
1040025

MWh fuel consumed for self-generation of steam
3534641

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
157065

Comment

C8.2d

(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	4816	4816	4816	4816
Heat	1197090	1197090	0	0
Steam	3534641	3534641	900603	900603
Cooling	0	0	0	0

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.

Country/area of low-carbon energy consumption
China

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Solar

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
875

Tracking instrument used
Contract

Country/area of origin (generation) of the low-carbon energy or energy attribute
China

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2020

Comment

Country/area of low-carbon energy consumption
Chile

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Renewable energy mix, please specify (Unknown)

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
611

Tracking instrument used
Contract

Country/area of origin (generation) of the low-carbon energy or energy attribute
Chile

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2019

Comment

Country/area of low-carbon energy consumption
Israel

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Solar

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
1328

Tracking instrument used
Contract

Country/area of origin (generation) of the low-carbon energy or energy attribute
Israel

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2021

Comment

Country/area of low-carbon energy consumption
United States of America

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Renewable energy mix, please specify (Unknown)

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
137

Tracking instrument used
I-REC

Country/area of origin (generation) of the low-carbon energy or energy attribute
United States of America

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2020

Comment

Country/area of low-carbon energy consumption
Turkey

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Wind

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
1080

Tracking instrument used
Contract

Country/area of origin (generation) of the low-carbon energy or energy attribute
Turkey

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2015

Comment

Country/area of low-carbon energy consumption
Czechia

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Solar

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
27

Tracking instrument used
Contract

Country/area of origin (generation) of the low-carbon energy or energy attribute
Czechia

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2016

Comment

Country/area of low-carbon energy consumption
Netherlands

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Solar

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
758

Tracking instrument used
Contract

Country/area of origin (generation) of the low-carbon energy or energy attribute
Netherlands

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2021

Comment

C8.2g

(C8.2g) Provide a breakdown by country/area of your non-fuel energy consumption in the reporting year.

Country/area
Algeria

Consumption of purchased electricity (MWh)
674

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Argentina

Consumption of purchased electricity (MWh)
11677

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Austria

Consumption of purchased electricity (MWh)
950

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Belgium

Consumption of purchased electricity (MWh)
9581

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Brazil

Consumption of purchased electricity (MWh)
29797

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Canada

Consumption of purchased electricity (MWh)

5601

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Chile

Consumption of purchased electricity (MWh)
1056

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
China

Consumption of purchased electricity (MWh)
26245

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Colombia

Consumption of purchased electricity (MWh)
1343

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Costa Rica

Consumption of purchased electricity (MWh)
1138

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Czechia

Consumption of purchased electricity (MWh)
1444

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Denmark

Consumption of purchased electricity (MWh)
818

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Egypt

Consumption of purchased electricity (MWh)
780

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
France

Consumption of purchased electricity (MWh)
14030

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Germany

Consumption of purchased electricity (MWh)

12585

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Greece

Consumption of purchased electricity (MWh)
843

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Guatemala

Consumption of purchased electricity (MWh)
76

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Hungary

Consumption of purchased electricity (MWh)
1439

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
India

Consumption of purchased electricity (MWh)
0

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Israel

Consumption of purchased electricity (MWh)
10042

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Italy

Consumption of purchased electricity (MWh)
32651

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Kenya

Consumption of purchased electricity (MWh)
259

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Malaysia

Consumption of purchased electricity (MWh)
2290

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Mexico

Consumption of purchased electricity (MWh)

3146

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Morocco

Consumption of purchased electricity (MWh)
2977

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Netherlands

Consumption of purchased electricity (MWh)
18504

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Norway

Consumption of purchased electricity (MWh)
1

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Poland

Consumption of purchased electricity (MWh)
4102

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Portugal

Consumption of purchased electricity (MWh)
2955

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Romania

Consumption of purchased electricity (MWh)
4983

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Russian Federation

Consumption of purchased electricity (MWh)
10853

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Saudi Arabia

Consumption of purchased electricity (MWh)
3525

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Singapore

Consumption of purchased electricity (MWh)

7242

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
South Africa

Consumption of purchased electricity (MWh)
3527

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Spain

Consumption of purchased electricity (MWh)
4831

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Sweden

Consumption of purchased electricity (MWh)
12626

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Turkey

Consumption of purchased electricity (MWh)
17468

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
United Kingdom of Great Britain and Northern Ireland

Consumption of purchased electricity (MWh)
6949

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Ukraine

Consumption of purchased electricity (MWh)
2071

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
United States of America

Consumption of purchased electricity (MWh)
1090949

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
51027

Total non-fuel energy consumption (MWh) [Auto-calculated]

Country/area
Viet Nam

Consumption of purchased electricity (MWh)
1369

Consumption of self-generated electricity (MWh)
0

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
0

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

Description
Waste

Metric value
1451

Metric numerator
Metric tons

Metric denominator (intensity metric only)

% change from previous year

Direction of change
<Not Applicable>

Please explain
Total Waste to landfill (Hazardous Waste)

Description
Waste

Metric value
12926

Metric numerator
Metric tons

Metric denominator (intensity metric only)

% change from previous year

Direction of change
<Not Applicable>

Please explain
Total Non-Landfill Waste (Hazardous Waste)

Description
Waste

Metric value
143796

Metric numerator
Metric tons

Metric denominator (intensity metric only)

% change from previous year

Direction of change
<Not Applicable>

Please explain
Total Waste to Landfill (Non-Hazardous Waste)

Description
Waste

Metric value
823971

Metric numerator
Metric Tons

Metric denominator (intensity metric only)

% change from previous year

Direction of change
<Not Applicable>

Please explain
Total Non-Landfill Waste (Non-Hazardous Waste)

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Grief 2022 GHG Verification Opinion_Final.pdf

Page/ section reference
Page 1 to 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.

Scope 2 approach
Scope 2 location-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Grief 2022 GHG Verification Opinion_Final.pdf

Page/ section reference
Page 1 to 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

Scope 2 approach
Scope 2 market-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Grief 2022 GHG Verification Opinion_Final.pdf

Page/ section reference
Page 1 to 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

C10.1c

(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope 3 category
Scope 3: Purchased goods and services
Scope 3: Capital goods
Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)
Scope 3: Upstream transportation and distribution
Scope 3: Waste generated in operations
Scope 3: Business travel
Scope 3: Employee commuting
Scope 3: End-of-life treatment of sold products

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Grief 2022 GHG Verification Opinion_Final.pdf

Page/section reference
Page 1 to 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C9. Additional metrics	Waste data	ERM CVS performed a limited assurance engagement, in accordance with the International Standard on Assurance engagement (ISAE 3000 (Revised)	ERM CVS performed a limited assurance engagement of Greif's fiscal year 2022 hazardous and nonhazardous waste data. ERM CVS_Greif 2022 Assurance Statement_Final.pdf

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

California CaT - ETS
Sweden carbon tax
UK ETS

C11.1b

(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.

California CaT - ETS

% of Scope 1 emissions covered by the ETS
4.96

% of Scope 2 emissions covered by the ETS
0

Period start date
January 1 2021

Period end date
December 31 2021

Allowances allocated
39809

Allowances purchased
0

Verified Scope 1 emissions in metric tons CO2e
32638

Verified Scope 2 emissions in metric tons CO2e
0

Details of ownership
Facilities we own and operate

Comment
Our two papermills in CA, Santa Clara and LA (Commerce) are covered under the California Cap-and-Trade. The Santa Clara mill is working to become steam independent, as the adjacent Co-Gen facility is planning to cease operations. We are also evaluating the timing of exiting the Cap-and Trade program as it is expected to become unprofitable in the future.

UK ETS

% of Scope 1 emissions covered by the ETS
0.32

% of Scope 2 emissions covered by the ETS
0.28

Period start date
January 1 2022

Period end date
December 31 2022

Allowances allocated
32170

Allowances purchased
48500

Verified Scope 1 emissions in metric tons CO2e
2304

Verified Scope 2 emissions in metric tons CO2e
1532

Details of ownership
Facilities we own and operate

Comment
In 2022, we paid approximately 15,000 EUR for the basic carbon tax charge. Greif belongs to a trade group and has a Climate Change Agreement (CCA) with the Government/Environment Agency for which we are in the 5th Period. Greif's Gas and electricity usage are charged a carbon tax levy and both gas and electricity have discounted rates due to our CCA.

C11.1c

(C11.1c) Complete the following table for each of the tax systems you are regulated by.

Sweden carbon tax

Period start date
November 1 2021

Period end date
October 31 2022

% of total Scope 1 emissions covered by tax
0.16

Total cost of tax paid
95800

Comment
Converted from €87,749 to $95,800 USD

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

Greif's primary strategy for complying with the carbon pricing systems it is currently regulated under and those that it may be regulated under in the future is to reduce its GHG emissions companywide through product and process innovation, and efficiency enhancement projects, among other things. In 2021, Greif announced a goal to reduce its Scope 1 and 2 emissions by 28% by 2030 relative to a 2019 base year. By achieving this target, Greif will reduce its exposure to carbon pricing mechanisms and thereby maintain compliance with GHG regulations.

Greif continuously engages with customers in order to create innovative and less carbon-intensive packaging solutions. For example, Greif had worked with customers to innovate our EcoBalance product line that is produced with post-consumer recycled materials. In keeping with its GHG reduction strategy, Greif has reinforced its focus on site-level efficiency enhancement programs. In 2022, we began investigating and pursuing renewable alternatives to replace our current electricity and natural gas consumption. Additionally, we have entered the contracting phase regarding virtual power purchase agreements (VPPA) in EMEA and conducted an onsite solar study for North America sites. In 2022, at our Singapore site, we began developing onsite solar capabilities. We conducted energy audits and developed energy efficiency roadmaps at our mill facilities and in 2023 we are expanding the initiative to additional sites. The Mill Group identified 66 energy efficiency projects for FY23, which we plan to address throughout FY23. In 2023, we plan to continue conducting energy audits which will inform the development of energy efficiency roadmaps for our global operations.

Greif has systematically undertaken efficiency enhancement programs since 2007 and expects to conduct them on an ongoing basis for the foreseeable future. In 2022, we implemented 45 energy efficiency projects, resulting in an annual savings of nearly 13 million kWh and approximately $750,000 across the organization. These projects include replacing equipment and updating processes that reduce energy demand, such as solar shading, waste heat recovery and implementing energy efficiency practices like lighting and HVAC replacements. Some of these projects were informed by or benefited from regulatory factors. For example, in 2022 Greif replaced equipment at its paperboard mills in Los Angeles, California and Fitchburg, Massachusetts with more energy efficient technology. These improvements led to a reduction of both greenhouse gasses and air pollutants. The updates allowed Greif to take advantage of Cap-and-Trade programs in California that provide California Carbon Allowances (CCA).

Additionally, in the Asia Pacific region, the Singapore government is expected to raise its carbon tax to S$25 per ton of GHG emissions in 2024 and 2025, and S$45 per ton of GHG emissions in 2026 and beyond as a result of the Carbon Pricing (Amendment) Act 2022, which came into force on March 7, 2023 and amends the Carbon Pricing Act 2018. The progressive increases will set Singapore on a trajectory to reach between S$50 and S$80 per ton of GHG emission by 2030. Currently, a Greif service provider, Sembcorp, absorbs the carbon tax associated with this regulation, but we are anticipating this to not be the case moving forward. As such, our measure to reduce our GHG emissions impact is through increased use of solar energy as part of our Project Zero CAPEX. Additionally, Zero CAPEX aims to leverage an in-house Turbine engine to generate our own electricity using gas as the primary fuel source.

C11.2

(C11.2) Has your organization canceled any project-based carbon credits within the reporting year?
No

C11.3

(C11.3) Does your organization use an internal price on carbon?
No, and we do not currently anticipate doing so in the next two years

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?
Yes, our suppliers
Yes, our customers/clients
Yes, other partners in the value chain

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement
Engagement & incentivization (changing supplier behavior)

Details of engagement
Other, please specify (Engaged suppliers on climate-related issues through required EcoVadis assessments and competitive engagements)

% of suppliers by number
1

% total procurement spend (direct and indirect)
39

% of supplier-related Scope 3 emissions as reported in C6.5
32.5

Rationale for the coverage of your engagement
(How Greif engages) Our sustainable value chain begins with the raw materials we procure and our partnered suppliers. To identify opportunities to advance our goals, our sourcing managers incorporate topics such as carbon content, recyclability and packaging improvement into conversations with many suppliers. Additionally, Greif engages with its key suppliers through the EcoVadis platform to analyze and incentivize performance on climate change targets.

(Why Greif selected certain suppliers) Greif began requesting that its 40 largest suppliers complete EcoVadis assessments in 2020, and continued to do so in 2021 and 2022, as these suppliers make up a large proportion of Greif's overall upstream Scope 3 emissions. In 2022, Greif announced its 2030 goals to evaluate the sustainability performance for 80% of its total spend with suppliers and assessed 47% of its suppliers year to date, all considered tier 1 or direct suppliers to Greif. As part of this program, Greif trained its buyers on the EcoVadis platform to understand the assessment, recognize the factors EcoVadis is rating and best utilize information from the assessments. Greif also shares EcoVadis training opportunities with our partner suppliers when relevant to help improve their sustainability initiatives.

Impact of engagement, including measures of success
(Measure of success) Greif's 2022 target was to assess 35% of its suppliers by total spend through the EcoVadis platform, at which level we define successful engagement. In 2022, we exceeded this goal with an EcoVadis response from 39% of our supplier spend.
(Description of impact) Greif assessed 39% of our supplier spend, exceeding our 35% goal by the end of 2022. Greif is now using this data to help better understand its upstream Scope 3 emissions profile to drive reductions in the lifecycle emissions associated with the company's products. Additionally, Greif has continued to build on the data gathered from EcoVadis by directly surveying key steel, plastic, and old corrugated containers (OCC) suppliers in 2022. The steel suppliers that were surveyed represent 32% of Greif's total spend on steel, while the plastics suppliers represent 77% of spend on plastics, and the OCC suppliers represent about 50% of Greif's spend on OCC.
Greif meets with its raw material suppliers to inform them of Greif's expectations to receive lower carbon raw materials. For example, Greif is working with supplier ArcelorMittal to test one of their low carbon steel options to manufacture Greif products. The testing is completed to determine both if the material is appropriate quality and meets Greif's requirements and to determine how much carbon reduction will be achieved by switching to ArcelorMittal's lower carbon products. On the plastics side, Greif is conducting similar testing and pilots with resin suppliers to innovate resins that are made from lower carbon recycled materials.

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement & Details of engagement

Collaboration & innovation	Run a campaign to encourage innovation to reduce climate change impacts

% of customers by number
18.55

% of customer - related Scope 3 emissions as reported in C6.5
18.55

Please explain the rationale for selecting this group of customers and scope of engagement
(How Greif engages) Greif works with customers to allay greenhouse gases in their supply chain. We prioritize customers that desire to impact their sustainability goals, including energy and emissions, and reduce costs. We collaborate with these customers frequently in an effort to develop products that meet their needs and those of others in the industry. We regularly meet with customers to identify collaborative projects to reduce each other's carbon emissions. One program that Greif has implemented is the use of a proprietary Green Tool, which assists customers in selecting the most efficient container with the lowest emissions for their needs. The Greif Green Tool is a flexible calculator that uses independent lifecycle data of Greif industrial packaging products – designed to assist our customers in making informed decisions about which industrial packaging best suits their products and to achieve their sustainability goals. The Green Tool allows customers to review and compare the environmental impact of plastic drums, steel drums, IBCs, fibre drums and big bags specifically related to their business. The tool enables companies to evaluate the GHG emissions associated with different packaging and shipping scenarios and assists customers in calculating their Scope 3 GHG emissions. To supplement the Greif Green Tool, we launched the Greif Green Tool Lite, which allows us to provide information more quickly to our customers. The Greif Green Tool Lite provides carbon footprint and reduction metrics that our customers can achieve by switching to a more sustainable product.

(Why Greif selected certain customers) Greif engages its top Global Industrial Packaging (GIP) customers with its Green Tool as they account for a disproportionately large percentage of the company's overall GIP sales. In total, Greif engaged 18.55% of those customers we consider to be our top GIP customers through the Greif Green Tool in 2022. 18.55% is determined by dividing the number of top customers engaged via the Greif Green Tool in 2022 divided by the total number of our top customers.

Impact of engagement, including measures of success
(Measure of success) In 2022, Greif had a goal of helping more than 40 customers, accounting for at least 8% of total revenue (i.e., last year's engagement performance), engage with the Green Tool while making purchasing decisions. This is the level at which we define successful engagement.

(Description of impact) Greif met its target for 2022 by having 52 customers (18.5% of which were GIP global key customers, by number), accounting for 9.69% of revenue, use the Green Tool to optimize their purchasing behaviour. Over the last year, Greif has seen a 69% increase in requests for the use of the Green Tool. Engaging customers with the Green Tool has led to an increase in the revenue of over $855 million from sustainability-tagged products within Greif's GIP business. In November 2022, Greif was presented the Sustainability Award by TotalEnergies to recognize our exemplary sustainability performance aligned with their values as a key strategic partner. Our ability to provide our customers with customized, detailed packaging solutions through tools such as the Greif Green Tool goes a long way to deliver on our vision of being the best-performing customer service company in the world. The Greif Green Tool continues to be essential for us to communicate our innovations and sustainable products and solutions. We observed a significant increase in customer requests to use this tool in 2022. The Greif Green Tool enables us to give customers insights into how various packaging options, transportation options and product end scenarios impact GHG emissions. We plan to update the tool with our latest products.

C12.1d

(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.

(Explanation of who "other partners in the value chain" constitutes) In addition to suppliers and customers, in 2022, Greif formally engaged with its transportation and distribution partners, investors, the World Business Council for Sustainable Development (WBCSD), and the Alliance To End Plastic Waste (AEPW), among other external stakeholders, on climate topics. These stakeholders were chosen for engagement because of our 2020 materiality assessment in which Greif's reliance on timely and cost-effective downstream distribution, public markets, and the policy effects of sustainable development organizations were identified as important factors in Greif's business.

(How Greif prioritizes engagement) When determining partners to engage with on our climate-related strategy, Greif considers in the following order: 1. Relevance to industry; 2. Relevance to sustainability and corporate strategies; 3. Alignment of workstream areas where Greif can have the highest impact through its expertise and where it can learn best practices; 4. Other member companies Greif can collaborate with to have larger impact on climate strategy and where it can learn best practices.

(How Greif engages) Greif engages with its transportation and distribution partners daily to incorporate climate-related factors into its logistics decision-making processes. Since 2014, Greif has formally partnered with the EPA's SmartWay program to manage logistics in an environmentally responsible manner. Greif uses carriers that are approved through the EPA's SmartWay initiative whenever possible. Greif includes SmartWay certification during the new carrier certification process. Additionally, Greif's SmartWay-approved carrier base accounts for 77 percent of miles travelled in North America. From 2014 to 2018, Greif has saved over 231,535 tons of CO2 mass emissions through the use of SmartWay carriers. Further, Greif participated in AEPW's Design for Circularity and Advance Recovery and Recycling workstreams to understand barriers, share best practices with other member companies, and discuss challenges and points of collaboration from the industrial packaging point of view in an effort to ideate solutions on consumer packaging circularity.

Greif engages investors in its climate-related strategy through formal earnings calls, sustainability reporting, and active responses to sustainability assessments, including CDP and EcoVadis. Greif engages with sustainability assessment firms to ensure accuracy, improve Greif's scores for the benefit of the investor community, and improve our sustainability practices whether through stronger governance, transparency, or establishing the appropriate management procedure for a given topic. Greif also attends meetings with current and potential investors to discuss its climate strategy, circular economy strategy, and other aspects of its sustainability program. Greif engages the communities in which it operates through public reporting, including its sustainability report, social media, conference attendance, and public meetings. Greif published its 2022 annual sustainability report for the benefit of the investor and broader stakeholder community, in which Greif's climate governance structure and general climate strategy are outlined.

We also hold formal relationships with ESG-specific associations and NGOs, including the United Nations Global Compact (UNGC), to identify emerging risks that may impact our business. Information from these groups, including long-term emerging risks, is provided to Greif's Risk Leader Committee (RLC).

(Measure of success) Greif measures successful engagement in various ways. One example includes the number of projects completed as part of the partnership. Greif most recently has worked with AEPW on two workstreams. Additionally, Greif considers the deliverables produced as part of the partnership. For example, Greif's partnership with WBSCD produced a paper on Industrial Packaging Circularity which included barriers companies may face and recommendations to increase circularity.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

No, but we plan to introduce climate-related requirements within the next two years

C12.3

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

Row 1

External engagement activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

Yes, our membership of/engagement with trade associations could influence policy, law, or regulation that may impact the climate

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

No, but we plan to have one in the next two years

Attach commitment or position statement(s)

<Not Applicable>

Describe the process(es) your organization has in place to ensure that your external engagement activities are consistent with your climate commitments and/or climate transition plan

Greif's Sustainability Steering Committee (SSC) is informed by and oversees engagement on climate-related matters, which led partially by the Executive Leadership Team (ELT), Chief Sustainability Officer, Vice President of Sustainability, product managers, legal department, and the EHS department. Since the SSC is also responsible for compliance with climate targets and climate risk assessment, it is well positioned to understand and guide interactions on climate issues.

Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

C12.3b

(C12.3b) Provide details of the trade associations your organization is a member of, or engages with, which are likely to take a position on any policy, law or regulation that may impact the climate.

Trade association
Other, please specify (100% Recycled Paperboard Alliance (RPA100))

Is your organization's position on climate change policy consistent with theirs?
Consistent

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The 100% Recycled Paperboard Alliance (RPA-100%) is an independent, non-profit trade alliance. RPA-100% brings together leading 100% recycled paperboard manufacturers to analyze the benefits and promotes the use of 100% recycled paperboard. For every ton of virgin paperboard that is converted to CRB/URB, one ton of recovered fiber is kept out of municipal landfills. This, in turn, reduces the amount of methane created in the landfill and further decreases greenhouse gases in the atmosphere.

Each Greif production facility manages quality, safety and environmental standards through certifications such as RPA 100 and, notably, most of our mills have RPA100 certification. Grief supports RPA100's missions through our own goal to achieve an average of 60% recycled raw material content across products. This target sets specific and measurable goals that build on our announcement in 2021 to reduce absolute Scope 1 and 2 greenhouse gas (GHG) emissions by 28% by the end of the decade. Our goals to increase recycled raw material content across our products and in turn reduce our GHG emissions, align with RPA-100%'s mission to spread the benefits of 100% recycled paperboard and in turn reduce the amount of methane created in the landfilling of non-recycled materials and further decrease greenhouse gases in the atmosphere.

Greif is an active executive committee member of RPA100 and plays an important role in influencing RPA's strategic direction related to increasing the use of recycled paper board.

Funding figure your organization provided to this trade association in the reporting year (currency as selected in C0.4)

Describe the aim of your organization's funding
<Not Applicable>

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?
Yes, we have evaluated, and it is aligned

Trade association
Other, please specify (American Forest & Paper Association)

Is your organization's position on climate change policy consistent with theirs?
Consistent

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
American Forest & Paper Association recognizes the ongoing challenges of our changing climate and our industry GHG goals reflect our commitment to reducing emissions. AF&PA members have already reduced GHG emissions by more than 23% from the 2005 baseline, surpassing our Better Practices, Better Planet 2020 goal. Our 2030 goal to Reduce Greenhouse Gas Emissions will advance our industry further with commitments to: (1) Reduce total Scope 1 and 2 GHG emissions intensity 50% by 2030 from a 2005 baseline, (2) Establish a goal by 2025 for relevant Scope 3 emissions.

Greif supports AF&PA's GHG Emissions reduction goals through our own goal to reduce absolute Scope 1 and Scope 2 GHG emissions 28 percent from a 2019 baseline. As a member of AF&PA's executive committee and Board of Directors, we play an important role in influencing AF&PAs strategic direction by reviewing and approving AF&PA's Better Practices, Better Planet goals.

Funding figure your organization provided to this trade association in the reporting year (currency as selected in C0.4)

Describe the aim of your organization's funding
<Not Applicable>

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?
Yes, we have evaluated, and it is aligned

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication
In mainstream reports

Status
Complete

Attach the document
Greif 2022 Annual Report.pdf

Page/Section reference
CEO's Letter, Risks Related to Industry Conditions (page 10), Risks Related to Regulatory and Legal Costs (page 16 & 17)

Content elements
Strategy
Risks & opportunities
Emission targets

Comment

C12.5

(C12.5) Indicate the collaborative frameworks, initiatives and/or commitments related to environmental issues for which you are a signatory/member.

	Environmental collaborative framework, initiative and/or commitment	Describe your organization's role within each framework, initiative and/or commitment
Row 1	UN Global Compact Other, please specify (Alliance to End Plastic Waste; CropLife Europe)	UN Global Compact: In April 2016, Greif became a signatory to the UN Global Compact, confirming our commitment to these Principles. We publish our Communication on Progress each year on the compact's Ten Principles. Integrity and respect for people are Core Values at Greif, and we believe that social and environmental responsibility are aligned and essential for long-term sustainability. The United Nations Global Compact is a voluntary strategic policy initiative for businesses committed to aligning their operations and strategies with ten universally accepted human rights, labor, environment and anti-corruption principles. We consider these Principles a natural extension of our Code of Conduct, which outlines our commitment to being open, honest and trustworthy in all dealings with all stakeholders. Our policies and procedures incorporate our commitment to human rights, freedom of association, environmental excellence and health and safety. Alliance to End Plastic Waste: In September 2021, Greif joined the Alliance to End Plastic Waste. Since 2019, the Alliance to End Plastic Waste has rallied around 90 member companies, project partners, allies and supporters committed to ending plastic waste in the environment. Greif joined this mission to partner with our customers and other organizations to bolster our circular economy strategy. We are the first industrial packaging firm to become a member to provide expertise from our unique perspective and be a leader in our industry. Membership requirements include investing in innovative projects to promote circular solutions. Greif participates in various work streams through this partnership, including Design for Circularity and Advanced Recovery & Recycling. We aim to bring the industrial packaging perspective to the group and partner with customers and other organizations to bolster our circular economy strategy. CropLife Europe: Consisting of corporates, national associations, and individual industry contributors, CropLife Europe represents the highly innovative, R&D-driven crop protection industry in Europe. Members develop conventional pesticides, biopesticides, plant biotech innovation, and digital and precision farming. CropLife Europe's ambition is to help European farmers transition towards a more sustainable and resilient agriculture, providing the largest toolbox possible for them to choose their preferred production model. Greif participates as a partner to the agriculture industry that supports solutions for packaging, moving and storing chemicals, feed and end products.

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	Yes, board-level oversight	Greif's Board is made aware of and needs to approve land management activities conducted by the company's Soterra business unit, including sustainability and climate change projects (e.g., carbon capture, solar farm development, carbon credit sales).	<Not Applicable>

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments and publicly endorsed initiatives related to biodiversity	Other, please specify (Committed to monitoring any impacts on the biodiversity of the lands we manage, including protecting corridors and stream zones, as needed.)	SDG Other, please specify (Sustainable Forestry Initiative, SDG6: Clean Water and Sanitation)

C15.3

(C15.3) Does your organization assess the impacts and dependencies of its value chain on biodiversity?

Impacts on biodiversity

Indicate whether your organization undertakes this type of assessment
Yes

Value chain stage(s) covered
Direct operations

Portfolio activity
<Not Applicable>

Tools and methods to assess impacts and/or dependencies on biodiversity
Other, please specify (Sustainable Forestry Initiative (SFI))

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)
Soterra, a land management company, has chosen to obtain SFI certification to demonstrate its commitment to sustainable practices and responsible forest management. SFI certification provides third-party validation of Soterra's adherence to the highest environmental and social standards in the industry, enhancing its reputation and credibility among stakeholders. Soterra has implemented SFI by integrating its standards and guidelines into its forestry practices, developing comprehensive policies and procedures that align with SFI principles. The company conducts regular assessments of forest health, wildlife habitat and water resources, while actively engaging with local communities. Soterra's implementation of SFI certification ensures the long-term health and resilience of forests and fosters positive relationships with stakeholders, while contributing to biodiversity conservation and sustainable land management.

Dependencies on biodiversity

Indicate whether your organization undertakes this type of assessment
Yes

Value chain stage(s) covered
Direct operations
Upstream
Downstream

Portfolio activity
<Not Applicable>

Tools and methods to assess impacts and/or dependencies on biodiversity
Other, please specify

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)
SFI certification has provided valuable insight into Soterra's impacts and dependencies on biodiversity, guiding the company's decision-making and actions. Through the certification process, Soterra conducts assessments of biodiversity and wildlife habitat in its managed forests, gaining a comprehensive understanding of the species diversity and ecosystem health. This knowledge enables Soterra to make informed decisions and take appropriate actions to mitigate negative impacts on biodiversity. By identifying areas of high ecological value and assessing risks, Soterra can implement measures such as protecting sensitive habitats, establishing wildlife corridors and adopting sustainable harvesting practices. SFI certification has thus empowered Soterra to prioritize biodiversity conservation, collaborate with stakeholders and ensure the long-term sustainability of its operations while actively safeguarding and promoting the health of ecosystems.

C15.4

(C15.4) Does your organization have activities located in or near to biodiversity- sensitive areas in the reporting year?
No

C15.5

(C15.5) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity- related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water management Species management Education & awareness

C15.6

(C15.6) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	No	Please select

C15.7

(C15.7) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments	

C16. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

C16.1

(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	President and Chief Executive Officer	Chief Executive Officer (CEO)

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	6349500000

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Requesting member
The Dow Chemical Company

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
11195

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified

Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
94000000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
The Dow Chemical Company

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
8561

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
94000000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Bayer AG

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1453

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Please select

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
12200000

Unit for market value or quantity of goods/services supplied

Please select

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Bayer AG

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1111

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
12200000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
FIRMENICH SA

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1471

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
12350000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
FIRMENICH SA

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1125

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
12350000

Unit for market value or quantity of goods/services supplied
Please select

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

---

Requesting member
Givaudan SA

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1096

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
9200000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Givaudan SA

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level

Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
838

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
9200000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
WestRock Company

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
3921

Uncertainty (±%)

Major sources of emissions
Emissions from production

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
32919624

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
WestRock Company

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
2998

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
32919624

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Philip Morris International

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Please select

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
151

Uncertainty (±%)

Major sources of emissions
Emissions from production

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
1269955

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Philip Morris International

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
116

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
1269955

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Baker Hughes Company

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
916

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
7692599

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Baker Hughes Company

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
701

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
7692599

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Ecolab Inc.

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
518

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
4348478

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Ecolab Inc.

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
396

Uncertainty (±%)

Major sources of emissions
Emissions from production

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
4348478

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Stéarinerie Dubois

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
181

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
1523216

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Stéarinerie Dubois

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
139

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
1523216

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Topsoe A/S

Scope of emissions
Scope 1

Scope 2 accounting method
<Not Applicable>

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
178

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
1495452

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Topsoe A/S

Scope of emissions
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
136

Uncertainty (±%)

Major sources of emissions
Emissions from production

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
1495452

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
Diversity of product lines makes accurately accounting for each product/product line cost ineffective	Greif produces a variety of different products. As such, accurately tracking emissions for each product line is difficult. Greif hopes that its ability to track emissions accurately will increase as its GHG inventory continues to advance in sophistication.

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?
Yes

SC1.4a

(SC1.4a) Describe how you plan to develop your capabilities.

Greif is currently in the process of reviewing and enhancing its GHG inventory approach. By enhancing its inventory, Greif hopes to become better able to isolate emissions associated with specific products and services that it provides to clients and therefore more accurately apportion them downstream.

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?
Please select

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

Submit your response

In which language are you submitting your response?
English

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

Please confirm below
I have read and accept the applicable Terms